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Radio Control CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

Display until July 10, 1986



**R/C
Funny Cars!**

**Radio
Review**



Wild!



Dirt Burners



**Monster
KONG**

Hot Paint Jobs





Radio Control **CAR ACTION**

Volume 1, Number 2
Spring 1986

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EDITORIAL

by LOUIS V. deFRANCESCO JR.

IT CAN BE REPORTED that the premier Winter 1986 issue of *Radio Control Car Action* was a tremendous success. Your response overwhelmed us and the letters are still pouring in! There was obviously a need for a high-quality, informative, and entertaining R/C car magazine.

Each issue will eclipse the previous effort and you'll see that when you jump into this one! We've got nitro-burning R/C funny cars and a dragster from one talented West Coast R/Cer who goes by the name of Cory Savage. There are a slew of modeling tips—everything from tuning your off-roader's suspension to painting Lexan car bodies. We've got all the newest and hottest R/C cars, including the Kong monster truck from MRP, the unreal RC500 from Team Associated, the unstoppable Raco Jac-Rabbit, the latest Dirt Burner from MRC called the Fox, and many others. The ultimate engine master himself, Peter Chinn, reviews the latest fire breather from O.S., and Mike Lee, our resident race reporter, covers the Las Vegas Speed Week competition.

We thank you for your input; after all, it's *your* magazine so let us know what you want and keep firing those letters our way. While you're out there having fun smokin' the asphalt or diggin' trenches with your latest R/C car, remember, make sure you are on an R/C car-only frequency and not an R/C aircraft frequency. You can cause someone out there a big headache by not using a car-only frequency. See page 96 for the correct listing of R/C car frequencies.

Modeling is fun, wild, creative, and zany! Enjoy! ■



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Letters



They Loved Us!

Congratulations on the new magazine. I'm glad there is finally going to be a publication exclusively for the R/C car modeling enthusiast...

LARRY CURTIS
Ontario, Canada

I read your magazine cover-to-cover 20-30 times and loved every second of it...

BEN ZUKOWSKI
Killingworth, Connecticut

...Last week I bought your magazine and saw your '32 Deuce. That's the radest R/C car I've ever seen...

ROBERT SIMPSON
Wasilla, Alaska

I am a 14-year-old model car enthusiast and I love your magazine! I've been waiting for a magazine about radio control cars for a long time now. I love the photos, features, "How-To's," everything about it. It's just perfect...

ROB PRICE
Reynolds Station, Kentucky

You have a beautiful magazine. May it go on forever. Good Luck!

FRANK KAPPEL
Chicago, Illinois

After purchasing my copy of *Radio Control Car Action* I was very happy to see the excellent reviews and especially the "What's New" department of your magazine. All the features and reports are very good....

AIDAN TAN
Saskatchewan, Canada

I just purchased your first edition—Winter 1986. May I offer you people many congratulations on your very fine magazine. I have been "into" this hobby for about six months and it has been hard to get information from less competent publications during that time. Your publication is great—just what I (and I bet many others) need....

EUGENE YOU
Los Angeles, California

I am new to R/C car racing. Until reading your magazine, I didn't know it was so popular. This magazine has answered a lot of my questions and will help me get started. "The Starting Line" has been a big help. Keep up the good work and don't change a thing; it's great.

ALAN WIENKE
Homer, Illinois

More On Asphalt Cars

How about a lot more space for, on, and about asphalt cars?

GARY HAIRSTON
Little Rock, Arkansas

Gary, this issue of *Radio Control Car Action* features an excellent review of the RC500, an all-out asphalt burner. Check it out on page 54.

Charge Up the Bruiser

I thoroughly enjoyed the premier issue of *Radio Control Car Action*. This magazine is hot!

I was very impressed with the Bruiser. I put in my order for one and now I'm waiting patiently. In the second to last paragraph of the article on the Bruiser it states: "The big pack can be fast-charged with a constant-current charger capable of delivering 4 amps for half an hour."

I'm referring to the 4,000-mAh battery pack for the Bruiser. My question is *who* produces such a charger capable of doing the above? I would be more than happy if you could tell me.

The great thing about this magazine is the photos—they're great!

JASON BROWN
Citrus Heights, California

Parma International and Model Rectifier Corporation both have five-cell, 4,000-mAh battery packs for the Bruiser. Neither require any modifications.

All You Need Is ROAR

I have your Winter '86 *Radio Control Car Action* magazine. I read a story on race track design. There is a club called Radio Operated Auto Racing (ROAR) on page 53. I would like the address so I can get rules and maybe hold a national-level race. I live in Middletown, New York, and we started our own club and need rules.

JOHN CABRAL
Middletown, New York

I'm just getting started in R/C off-road cars. Are there any races or clubs to your knowledge in Minnesota, Wisconsin, or Iowa? I would really like to get involved in racing. Thanks for your time!

BRENT NELSON
Litchfield, Minnesota

I went to an R/C show and got your magazine, *Radio Control Car Action*. In it was a story called "Race Track Design." My Dad, brother, and myself would like to start a little race track. There are about 15 people in our town that have R/C cars and we would all like to race them and do it by the rules. Your magazine said to write to the Radio Operated Auto Racing club (ROAR) for more on rules and I was wondering if you could give me their address. If you have anything on track designs, rules, and so on, please send it to me. The show I went to was in South Bend, Indiana.

RANDALL RIEGSECKER
Middlebury, Indiana

There are regional chapters of ROAR nationally and in Canada. Contact the Radio Operated Auto Racing club at P.O. Box 1536, Lawrenceville, GA 30426-1536; (404) 962-6401.

Track Report

Airtronics **XL2P** Radio System

by Charlie Kenney

LET'S TAKE a look at a new Airtronics* radio, the XL2P for cars and boats, which I evaluated in a car. Airtronics has a long and impressive record for innovative R C radio designs. Their new XL2P pistol grip radio is specifically designed for high-performance R C car and boat operation.

The well-balanced pistol grip handle comfortably conforms to your hand grip and easily reverses for ambidextrous use. The XL2P's superior design provides the modeler with sensitive trigger throttle response and precision turn control, regardless of surface condition.

This advanced two-channel system is engineered with all the high-tech features serious car modelers require. Standard features include low throttle adjustment, steering rate adjustment, servo reversing, throttle end-point adjustment, and a unique thumb-actuated proportional brake control.

The XL2P also features a "posi-grip" wheel with adjustable steering tension, a compact and lightweight state-of-the-art receiver, and an optional nickel-cadmium rechargeable battery.

A variety of quality servos are also

available for R C applications. Airtronics also offers optional speed controllers and compatible accessories to further expand the XL2P's capabilities.

Let me summarize the features of the XL2P system:

Transmitter

- High 500-milliwatt RF output.
- Unique pistol-grip design with reversible handle for left-handed operation.
- Trigger-operated throttle, with proportional brake, trim, end-point adjustments, and servo reverse.
- Multi-function "back" switch for reverse, preset throttle, and or brake operations.
- Wheel-type directional control, with trim, variable dual rate, and servo reverse.
- Externally adjustable steering wheel tension.
- Calibrated RF power output meter.
- High visibility LED "On" indicator.
- Safety strap hook and carrying handle.
- Available on all approved 27 and 75 MHz AM frequencies; 27 MHz frequencies changed by plug-in crystals; 75 MHz frequency changes require service center crystal change and tuning.
- 27 MHz crystals easily accessible on front panel.
- Easily changed alkaline battery power is standard.



The Airtronics XL2P transmitter, the heart of the radio system.



Dual rate steering control and trim control knobs below handle.

- Nickel-cadmium battery conversion and charger available.
- Short retractable 24-inch antenna.
- Overall measurements: 6.9x9.5x5.25 inches.
- Weight, including batteries: 25 ounces.

Receiver

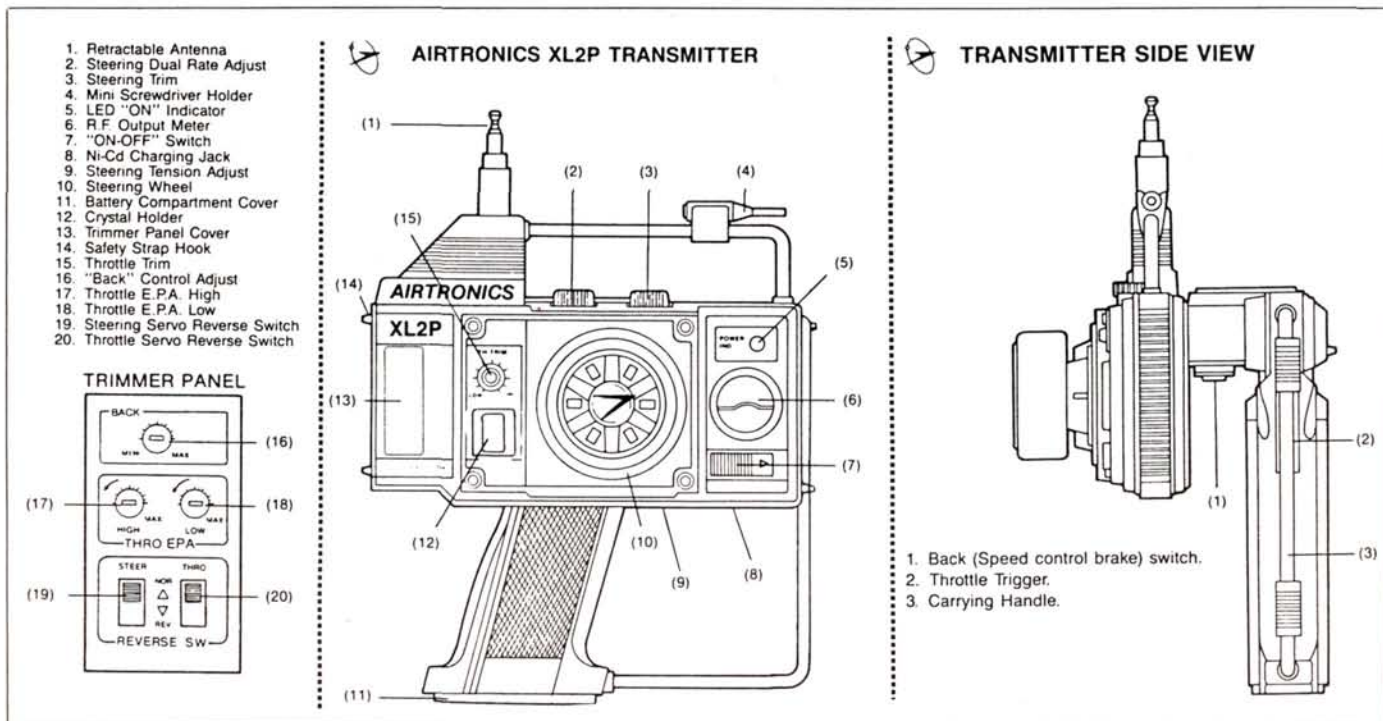
- Small size, 2.0x1.3x0.75 inches.
- Lightweight, 1.0 ounce with crystal.
- Rugged shock-resistant construction.
- Externally accessible crystal for rapid changes.

- Standard Airtronics connectors for compatibility with all Airtronics servos and accessories.
- Power required: 4.8-6.0 volts supplied from alkaline or nickel-cadmium cells, from speed controller, or from drive batteries with proper regulator.
- Short, easily installed 19-inch antenna.

Servos

The Airtronics XL2P is available in three versions with different servos for specific applications.

- XL2P/631 with heavy-duty standard servos: weight 1.8 ounces, torque 48 ounce-inches, size 1.54x0.70x1.59 inches, transit time 90°/0.3 second.
- XL2P/462 with high-speed ball bearing mini servos: weight 1.1 ounces, torque 27 ounce-inches, size 1.54x0.79 x1.59 inches, transit time 90°/0.2 second.
- XL2P/557 with high-speed ball bearing coreless motor servos: weight 2.08 ounces, torque 50 ounce-inches, size



XL2P

1.46x0.75x1.44 inches, transit time 90°/0.25 second.

- All feature IC amplifiers and carbon pots with carbon button wipers for precision and long life.
- Compatible plug-in speed controllers available for special applications.

The particular XL2P radio provided for my evaluation operated on 27.255 MHz with a blue frequency color.

Let's take a more detailed look at the transmitter. The Airtronics XL2P transmitter configuration is unique from other pistol-grip type configurations I've seen in that the grip itself is some 3 inches behind the steering wheel. This is due to the particular design of the handle reversing feature to take care of left-handed steering devotees. To accomplish the reversal, turn the transmitter so that the handle is facing you and remove the two screws holding the cover. Under the cover, you'll find three $\frac{3}{32}$ -inch Allen-head cap screws which should also be removed. You must remove the safety strap hook from its slot and then the pistol grip is free, except for two wire harnesses that are connected to the front panel electronics. Rotate the grip 180° and note that the carrying handle now fits into the slot where the safety strap hook was and vice versa. Be careful to route the wire harnesses so that they are

clear of any obstructions and re-install the three Allen-head screws and handle cover (see figure 2). Make sure everything is operating properly.

Take a look at the transmitter controls. Starting at the top left is the eight-element 24-inch antenna. It should always be extended to full length when operating your car or boat. To the right of the antenna on the handle you mount a small plastic screwdriver and holder which can be used for making adjustments on the trimmer panel.

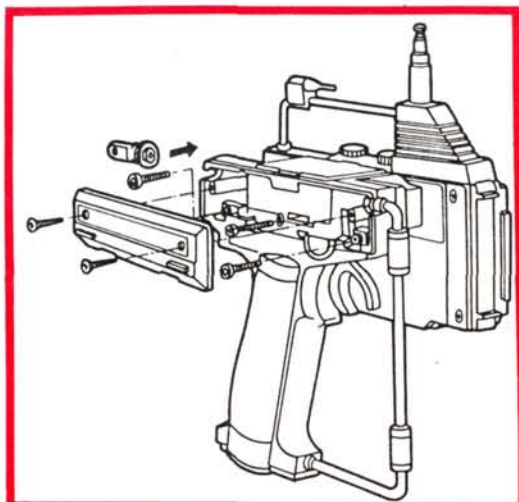
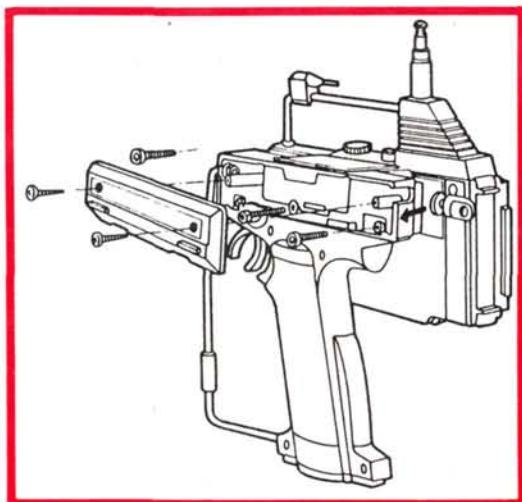
Below you'll find, left to right, the steering dual-rate adjust and steering trim control, both are thumb wheels which do the following: steering dual-rate adjustment is used to reduce the overall rate of the steering servo. With the dual-rate wheel control at maximum, the servo will rotate 90° with full steering wheel movement. At the minimum position of the dual-rate knob, the servo

rotation is reduced to 45°, or half of the total excursion. With a new car, it's recommended that the dual-rate be set in its center position and steering adjust-

(Continued on page 91)



Left: Optional nickel-cadmium packs available for XL2P system. **Below:** Accessories provided with XL2P. Note small adjustment wand. **Far below:** Car unit includes two servos, receiver switch, battery holder.



TRANSMITTER HANDLE REVERSE

by Rich Hemstreet

Painting Lexan

Right: Use the right material for a good looking car. Far right: To begin, mask all window areas.



PAINTING A sharp-looking Lexan body is easier than getting into the A Main. The key is using the correct materials. The two critical elements for painting Lexan bodies are masking tape and paint. I suggest 3M masking tape. Especially important is 3M Fine Line tape, which comes in widths down to $1/16$ inch. The Fine Line tape can handle curves without lifting and bunching, and it can be purchased at automotive stores. Plastic packing tape is also useful for providing a seep-proof edge.

The paint you choose is very important. If you use the wrong paint, it won't stick to the Lexan when you nail a wall.

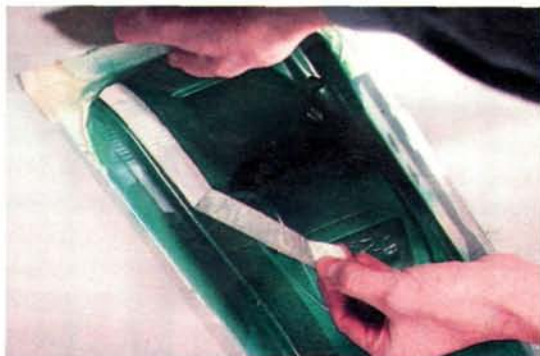
I recommend acrylic lacquer. This paint will usually bond with the Lexan so that it won't flake off under racing conditions. If you're using an airbrush, you can purchase the paint at an automotive paint dealer or you can use spray cans to paint your cars and still choose an acrylic lacquer. Rust-Oleum is one brand available nationally. Many automotive touch-up paints are also available in spray cans. If you're planning on using a brush, you can use MRC-Tamiya's* line of paint for polycarbonate bodies. This paint also works well for details done by hand before you spray the rest of the car.

Whatever paint you use, test it before you trust it. Even



Far left: Mask between the fine line tape to make a color panel. Left: Striping follows body contours.

The masking being removed for the second color.



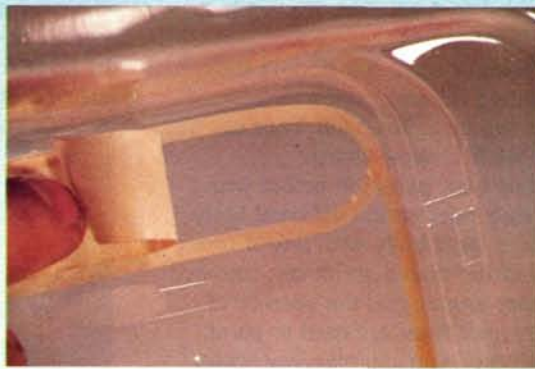
The fine line tape being removed.

Simple three-color scheme.



Bodies

**A step-by-step approach
for a winning paint job.**



Far left: Look for rounded corners on body and make sure all tape edges are snug. Left: Mask following the body contours.

some acrylic lacquers flake off. Put one or two coats of any new paint on a piece of scrap Lexan (windows cut from junked bodies work great). After the paint dries, rapidly twist and flex the Lexan. If the paint starts flaking off, beware! Also be careful of all shades of red; most reds flake off very easily.

To get red (and most other colors that fail your test) to stick requires first spraying on a coat of clear Rust-O-leum Speedy Dry. After the clear is dry, apply the problem color over it. This usually works.

I suggest the novice painter use spray cans for most of

the painting and a brush for detail work. You can purchase a basic airbrush kit for under \$30, but any method you use will work if you take your time and are careful. Painting by brush only leads to a heavier body because it's difficult to get even coverage.

There are at least three reasons for using a good painting technique and even a beginner should be able to produce a sharp three-color paint job with a little practice. The first reason is appearance. Don't give in to the temptation to take your new body out of its bag and spray the whole car, windows and all, a single color. While a car

Right: If possible, spray the dark color first, using light coats. Far right: Masking for the second color ready to be removed.



Body ready to trim and mount.

Going from clear to painted is really not all that hard. After painting dress up the car with details.



Painting Lexan Bodies

painted like this will perform on the track, it will not make you or your hobby look as good to spectators. Remember, spectators are potential R/C enthusiasts.

Second, you want the paint to stick. If it doesn't stick, you've wasted your time painting the car.

Third, a good paint job will be lightweight. Your car will run faster and handle better while looking sharp.

You should start planning your paint job before you buy that new body. If your club rules permit different body styles, look for these features: a large body with lots of room to work, such as a stock car rather than a sprint car; rounded corners rather than hard, sharp angles; and the absence of tall, narrow fins and spoilers, since these are hard to paint.

After you have the new body, you can plan your color scheme. Either copy a full-size racer or come up with an original design. It's helpful to make a rough sketch of the car to draw different paint schemes on. This sketch can become a blueprint to follow through masking and painting. Look at the body contours while designing your paint scheme. Don't fight the contours; it will make the painting more difficult, and the results may be disappointing.

To prepare the body for painting, wash out the inside with a mild detergent. Rinse the soap out thoroughly and dry the body completely with a lint-free rag.

Place the body over the chassis and use a permanent marker on the outside of the body to show where the body mount and antenna holes should be. When painting is complete, you can easily make the holes to mount the body.

Now mask-off the glass area. All masking and painting are done from the inside. For the windows, use either masking tape or plastic packing tape. Trim the tape along the window lines with a hobby knife.

At this time, before any other masking, you should do any detail painting. If you want to paint the grill or exhaust vents or ducts, do so now. Use a fine paint brush and hand-paint the details.

When you start masking for colors, the last color to be applied is masked first. Try to work it out so that your darkest color is sprayed on first. Hopefully, your lightest color will go on last. The reason for painting the darkest colors first is to prevent them from bleeding through or shading a lighter colored area. If you do paint a lighter color first, back it with a coat of white before you apply the darker color. This will prevent the darker color from showing through. But on the other hand, this extra layer of paint costs additional time (in painting) and adds weight.

Be sure that all masks are tight against the body to prevent paint from seeping under the masking. A burnishing tool used for dry transfer lettering works well to push the tape down in hard-to-get-at spots. A fingernail works fine in open areas.

Before you start painting, place the spray can in a bowl of hot tap water. Shake the can a few times and set it back in the water. This heats the paint and makes a finer mist with less running.

Dry your first can and shake well. Spray a very light coat over the entire inside of the car. Use a smooth sweeping motion as you spray. Avoid getting paint on the outside of the body. *Do not* put the paint on in a heavy coat. Just add one coat of mist after the previous coat is dry.



If you're planning on brushing the paint on, you can use MRC-Tamiya's line of paint for polycarbonate bodies.

After two or three light coats of paint, examine the car closely to see if all unmasked areas are covered. If everything is covered, place the car right-side-up on a table with overhead lighting. If the first color appears to be solid, wait for it to dry and go on to the next color.

Too often a beginner will hold a car body up to a light to see if it has enough paint on it. Under harsh, direct light, you should be able to see through a good paint job. Don't put so much paint on that it's impossible to see light through it. When the body is mounted on the chassis, there will not be any light passing through the body and the more paint you put on, the heavier the body becomes.

Put your second can of paint in hot water, then remove the masking tape which covers the second area to be painted. If that mask is overlapping any mask that's to stay in place for the next coat of paint, be sure to press the latter back in place. If the first color seeped under the mask you've just removed, use your hobby knife to scrape it off that area. Don't worry about scratches in the Lexan; after the paint is put on, you won't see them.

After two or three light coats of your second color, check the body on a table again.

Continue the same procedure until the entire car is painted. Take your time and let the paint dry before pulling off the masking. Don't pull the tape up rapidly; pull slowly.

After the body is dry, you can peel off the window masks. Make the holes for your body mounts and trim the wheel wells. Add your car number and other details and decals, and you're ready to race the sharpest car of your R/C career!

**The following is the address of the company mentioned in this article:*

MRC-Tamiya, Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

The Starting Line

by Fred Fischer

This question/answer format is designed for beginners and will attempt to answer questions, correct misconceptions, and generally ease entry into the rapidly growing hobby/sport of R/C cars. We welcome your questions, as answers to representative questions will help other beginners. Direct your questions to Fred Fischer, c/o *R/C Car Action*, 632 Danbury Rd., Wilton, CT 06897.

Probably the most misunderstood part of our hobby is the radio control (R/C) system. It is the part that we hold in our hand to drive a car and also the part in the car that pushes and pulls to steer and control the speed of the car. This month I'll concentrate on the R/C system and its components:

Q. What are the parts of an R/C system?

A. First is the transmitter, which is the control box for the car and which transmits a radio signal. Second is the receiver, which picks up the radio signal and turns it into special electrical signals. Last are the servos, which take those special signals and turn them into mechanical motion that corresponds to how you are moving the controls on the transmitter. The full name for this is a radio remote control system, which means you can control your car from a distance.

Q. What is meant by frequency?

A. This is a complicated subject, but for ease of understanding think about this: every radio and TV station has a different spot on your radio and TV tuner so that they don't interfere with each other. Each one is on a different frequency in order to do this. Your R/C system can be used in a crowd of other R/C systems as long as no two radios have the same frequency. Frequency is measured in megahertz (MHz). You do not have to do anything about this except to note what frequency is marked on your system and to avoid using your set at the same time that another modeler might be using the same frequency.

Q. What frequencies are legal for R/C cars?

A. You should buy a set that is on a frequency between 26.995 MHz to 27.195 MHz, or 75.410 MHz to 75.990 MHz. You *should not* buy an R/C system for "aircraft only" frequencies which have 72 MHz numbers (except for 72.160, 72.320, and 72.960 MHz, which are okay) because they will interfere with R/C aircraft fliers nearby and because they're illegal!

Q. What is a frequency flag?

A. A frequency flag is a device to hang on your transmitter so that other modelers can recognize, at a glance, what frequency you're using. They use different colors and numbers (called "channel numbers") for identification. It's a point of courtesy and good sense to use a flag.

Q. What do they mean by a "two-channel" R/C system?

A. "Two-channel" means there are two separate functions that you can operate with a system. Usually, with a two-channel system you'll use one channel to control steering and the second channel to control the speed of the car.

Q. What kind of R/C system should I buy if I'm a beginner?

A. A two-channel, two-stick system is the simplest and most economical package to buy. Almost every manufacturer makes at least one type of this system and almost every one will fit R/C cars.

Q. Should I buy a system with waterproof servos?

A. Most modelers don't like to run their cars in mud or water and most cars have some degree of water resistance anyway, so waterproof servos are unnecessary. Only if you race your car at a very muddy track should you consider the extra expense of waterproof servos.

Q. What is servo reversing?

A. Servo reversing is a function that allows you to change the direction that a servo rotates when you move the control. For instance, let's say when you move your control stick to the right, the servo rotates counterclockwise. By moving a switch on the transmitter, you can make the servo rotate clockwise instead. This function is important only if you move your R/C system from one car to another frequently. Usually, when you move the control stick for steering to the right, the car should steer to the right when it's moving away from you. If you install the servo incorrectly and the car steers to the left instead, you can correct it by flipping the reversing switch for the steering control. This same principle works for the throttle speed control. Most modelers set their car up so that the car moves forward when they move the throttle stick forward. If they put the servo in incorrectly, it can be corrected by the reversing switch. Reversing switches are not necessary, but are a nice feature.

Q. Can I use rechargeable batteries in my R/C system?

A. I suggest you check that out with the manufacturer of the R/C system. Most R/C systems can use rechargeable batteries, but an adaptor might be necessary or you might have to figure out a way to recharge the batteries outside of the control box or receiver battery box.

Q. How long can I use my R/C system?

A. Most R/C systems can operate at least one hour on batteries before they have to have the alkaline batteries replaced or have the rechargeable batteries recharged. By the way, rechargeable batteries are usually the nickel cadmium type. If your R/C system starts to operate erratically after some time in operation, you should check your system as noted in the R/C system operating manual to see if the batteries are getting low. If the servos start to slow down, that could also be a sign that the receiver battery is getting weak.

Q. What is the trim on a transmitter control?

A. A trim allows a small correction to the rest position of a servo. For instance, if your car moves a little to the right even though the control stick is sitting in the middle, you can correct this imbalance by moving the steering trim to the left to offset the steering error. Keep in mind that the trim should be used only for very minor corrections. If the car steers more to one side or if the speed control does not turn off or on properly, you should make these major corrections by adjusting the servo mounting position, the servo linkages, or both.

Q. What other features should I look for when buying an R/C system?

A. I suggest that you examine the system for ease of use, availability of parts and service, length and terms of the warranty, the reputation of the manufacturer and the hobby dealer, any special features of the particular R/C system that you like, plus the price. Like everything else, you should compare these factors carefully to find the "best buy" for yourself. ■

Engine Review

O.S. MAX-21 FSR-B

by PETER CHINN



SPECIFICATIONS

Type: Air-cooled, single-cylinder, side-exhaust two-stroke-cycle with crankshaft rotary-valve and Schnuerle scavenging.

Bore: 16.6 mm (0.6535 in.)

Stroke: 16.0 mm (0.6299 in.)

Displacement: 3.463cc (0.2113 cu in.)

Nominal Compression Ratio (full stroke): 11.5:1

Speed Control: O.S. Type 2K adjustable automatic mixture control carburetor.

Checked Weights: 304 grams (10.7 oz) less air cleaner; 337 grams (11.9 oz) with air cleaner.

Mounting Dimensions:

Crankcase width: 30 mm

Length from driver face: 77 mm

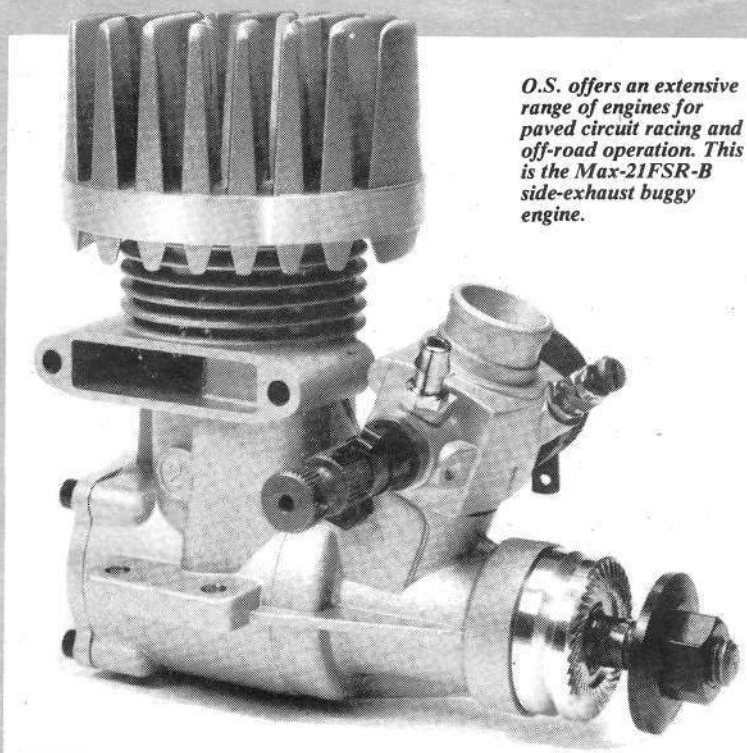
Height above CL: 75 mm

Bolt hole spacing: 38x15 mm

Manufacturer's Claimed Power Output: 1.0 bhp at 24,000 rpm.

Manufacturer: O.S. Engine Manufacturing Co. Ltd., Higashisumiyoshi-ku, Osaka 546, Japan.

U.S. Distributor: Great Planes Model Distributors Company, P.O. Box 4021, Champaign, IL 61820.



O.S. offers an extensive range of engines for paved circuit racing and off-road operation. This is the Max-21FSR-B side-exhaust buggy engine.

AS EXPLAINED in our recent review of the Max-21VF-R engine in the Winter 1986 issue of *R/C Car Action*, the O.S. company manufactures 3.5cc class R/C car engines in both rear exhaust and side exhaust models and in track-car and off-road versions. As was noted at that time, the rear-exhaust 21VF-R made an impressive start, within a month or two of its introduction, by taking second place in the 1985 World Championships for one-eighth scale circuit racing cars. This month, by way of contrast, we are covering the side-exhaust 21FSR-B off-road or "buggy" engine.

As is to be expected, the various models in the Max-21 range (all of which have the same bore and stroke) share certain parts, but there are a lot of differences between the rear exhaust circuit racing engine and the side exhaust buggy engine and none of the com-

ponents of these two engines can be interchanged.

Externally, of course, the differences are easy enough to see. Quite apart from its main casting which, unlike the rear-exhaust engine casting, has an integral front housing, the buggy engine uses the special curved-fin cylinder head that was first seen on the original Max-21VF-B rear-exhaust buggy engine introduced in 1984. The purpose of this is to ensure that the fins are correctly exposed to the cooling airstream irrespective of whether the type of transmission used requires the engine to be mounted north-south or east-west on the chassis. Because six screws are used to secure the cylinder-head, it is not possible to rotate the head through 90 degrees. Therefore, the head fins are curved in such a way that a 60 degree rotation will continue to present the fins end-on to the airstream.

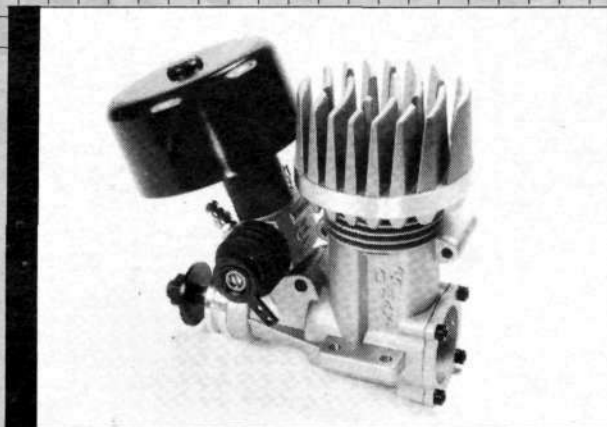
Unlike the 21VF-R, which is fitted with one of the new O.S. Type 2S slide-throttle racing carburetors, having a massive 54 sq mm choke area, the 21FSR-B, as befits a buggy engine, has a Type 2K barrel-throttle carb with a more modest 38 sq mm effective choke area. Mixture is drawn through a slightly shorter valve port in the twin ball bearing crankshaft, but valve timing is basically the same at 35 degrees ABDC to 65 degrees ATDC.

Cylinder port timing, on the other hand, is slightly more modest at 168 degrees for the exhaust and 124 degrees for the inlet ports. Scavenging, needless to say, is of the Schnuerle-plus-third-port type, but with three inlet ports instead of four. As with all the 21FSR series engines, the hard-plated brass cylinder liner is rotated in the casting to bring the exhaust port to the right rear quarter. The bypass flutes in the casting are repositioned accordingly to line up with the sleeve ports. This feature, first used several years ago on the O.S. Max-25FSR engine, was adopted for purely practical reasons: it provides a continuous cylinder wall surface, uninterrupted by ports, for the Teflon end-pads of the full-floating wristpin. The engine is, of course, of the ABC type with a convergent bore and finely fitted ringless aluminum piston. The conrod is of machined high duty aluminum and is bronze bushed at both ends.

In common with other O.S. buggy engines, the 21FSR-B is supplied with a large, plastic-bodied air-cleaner of the replaceable-element type. It comes complete with two small and two large elements that can be used in different combinations according to the severity of the off-road operating conditions.

O.S. claims a substantially lower peak power for the Max-21FSR-B than for their track racing engines, but the rated output of 1.0 bhp at 24,000 rpm is, needless to say, still remarkable for an engine of only 3.5cc displacement and reflects the astonishing strides that have been made in model car engines during recent years.

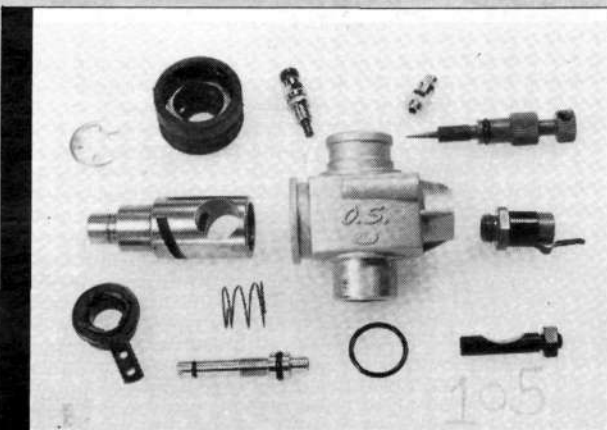
Peter Chinn, c/o R/C Car Action, 632 Danbury Rd., Wilton, CT 06897. ■



Curved-fin head can be rotated for best airflow. Large air-cleaner is included.



Parts exhibit usual O.S. attention to detail and high-quality manufacture.



Type 2K carburetor provides adjustable automatic mixture control for best throttle response.

Track Report

Monogram Models

From box to dirt in an hour, the Lightning is an R/C revolution!



W

HEN THE going gets tough, the tough get going." How

many times have you heard that saying? Well, Monogram Models* has a lot of competition in R/C off-road cars and they meet this competition head on!

The Monogram Lightning is a complete package as it comes in the box. There is nothing else to buy, which makes this car a fantastic value in itself. The car is 1/10-scale and comes to nearly 15

Lightning

by MALCOM YOUNG

inches in length.

THE KIT. So what can you say about a nifty, super rambunctious, almost-ready-to-run electric car that requires about 30 minutes of labor to assemble? It's simply super!



Lightning

Here is a list of tools, equipment, and accessories that you will need to get the car running: a Phillips-head screwdriver.

That's it! Everything else is there: radio, receiver, servos, batteries, battery charger, wrench, and decals. The only thing you have to do is charge the batteries, apply the decals, and put in a couple of screws. I think future editions of *Webster's Dictionary* will have a picture of the Monogram Lightning under the word "simplicity." It's simple to assemble and the illustrated instructions are as basic as you could want. No one should have any problem understanding them.

ASSEMBLY. The design features of the Monogram Lightning are quite unique and ingenious. The car chassis is a unit that contains the receiver, transmission, RS-540S electric motor, receiver batteries, switch, and rear-end drive system. The assembly of the front-end components, wheels and tires, and rear shock strut is about all there is to do, other than charge the batteries. Included with the set are ten Duracell AA batteries for the transmitter and receiver power, and a 7.2-volt battery that drives the rear wheels. The four batteries for the receiver are placed in pre-arranged slots (identified for polarity) that are molded into the body frame. The 7.2-volt drive-train battery then sits on top of these and is secured with a rubber band. It has a quick-disconnect connector for easy access to the charging jack.



Wave-hunter transmitter is included in kit.

The drive system is another well-planned unitized affair. The axle, gears, and drive motor are all contained in one unit that utilizes the swinging-arm suspension system popular in full-size, high-quality motorcycles. The housing that contains the electric motor and drive gears is attached to the main body frame at two points, 3 inches apart, and is allowed to pivot within these locations. The pivot action is controlled and dampened by use of a captured shock absorber.

The tires on the Lightning are soft, molded rubber and are 3 inches in diameter on the front and 3½ inches on the rear. The rear tires have deep cleats spaced ¼-inch apart and have superior digging power in dirt and sand. The ribbed front tires let you go where you want to without roaming all over the place.

The radio-controlled motion activator

enables forward as well as reverse direction capability, just in case you get stuck in a ditch.



PERFORMANCE. With the independent and shocked front end, the low CG, and the good weight distribution of the Lightning, the car behaves very well under all speed modes and terrain conditions. You can run it flat-out on pavement and achieve very sharp turns without any problem. The steering is a bit sensitive, however this is just a matter of getting used to. On dirt and sand, the Lightning excels. It will throw a rooster tail of dirt behind it on start and never look back. It really goes and the soft tires give superb traction when it's needed.

All in all, the Monogram Lightning is a very well engineered car that will last for a long time and give you a heck of a lot of fun for your money.

**The following is the address of the company mentioned in this article:*

Monogram Models, 8601 Waukegan Rd.,
Morton Grove, IL 60053. ■



The Lightning comes almost ready to run with minimal assembly. Note neat packaging.



Motor, radio, and chassis come already installed. Note slick-looking body.

Track Report

Hobby Shack

SILVER FOX

Nothing but wildness from
this nitro-burning stump puller!



by RICH URAVITCH

THE FINE ART OF miniature off-roading—or “neighborhood intimidation,” depending on your perspective—has achieved new heights with the introduction of a new breed of large-displacement, gas-powered iron. These cars are the Goliaths among the Philistines. They ask no quarter, simply because it's unnecessary; they merely forage through whatever looms in their paths! They are exciting, purposeful, and downright gems of design.

The Thunder Tiger “Silver Fox,” marketed by Hobby Shack*, typifies the breed. Its nearly 8 pounds of weight is packaged in a sturdy

aluminum frame and powered by a .21 engine, which is one of the largest sizes used in R/C cars.

THE KIT. Hobby Shack currently advertises the Silver Fox as being available fully assembled, either with or without their Thunder Tiger .21 FSR R/C engine. This special bonus was not available when I received mine, so I had to assemble the kit myself. This was a fun project for which I enlisted the services of my wife, Maribet, who, truth be known, performed the lion's share of the assembly. In all fairness, there were some minor obstacles encountered but nothing really difficult. I don't know if the



Silver Fox with engine and radio installed. Note durable aluminum ladder frame and coil-over shocks.

Silver Fox can still be purchased in kit form, but if it can, here are a few assembly tips.

ASSEMBLY. I selected the Thunder Tiger .21 engine for my Silver Fox, mostly because it was available from, and recommended by, Hobby Shack. The engine works fine, but the carburetor must be rotated 180°, which will place the throttle lever on the left side of the engine with the needle valve opposite. This might be true of other engines also.

Regardless of your choice of engine, I strongly recommend bench running or breaking-in your engine *before* you install it in the chassis. The recommended break-in procedure is included with the engine. Although this can be accomplished while the engine is installed, it will be frustrating because the tendency is to get maximum power out of a brand new engine by "leaning out" the fuel/air mixture. This is likely to cause overheating, stalling, and poor throttle response, in addition to premature, unnecessary wear. Take your

time and do it properly; "firebreathing" will come soon enough!

After you've broken-in the engine properly, you'll be immediately rewarded by two desirable qualities—the super idle and the brisk acceleration. You'll also notice the welcomed lack of noise due to the expansion type muffler.

I used a Futaba* radio with S-26 servos in my Silver Fox. The installation was not difficult but required some dexterity when installing the servo mounting clips. The steering linkage is simple with the servo output arm connected to a bellcrank, to which both tie-rods are also connected. The throttle/brake linkage is a bit more complicated but no real problem. One terrific feature is that *all* the radio equipment is housed in a water-tight box with waterproof rubber fittings for the servo pushrod wires and switch—great for those frequent mud hole challenges!

To get this show *off* the road, as it were, you'll



The Silver Fox is virtually unstoppable. Mud, snow and rocks were no obstacles to the formidable Fox.

need the following starting equipment: a 1.5-volt DC power source (battery); a glowplug clip (alligator clips work fine); a 12-volt electric starter; a 12-volt battery (motorcycle or car); fuel (glow engine, 10% nitro is fine); and spare glowplugs (R/C long).

The starter will require the addition of a "doughnut" type rubber ring which will turn the knurled engine flywheel on contact. Remember, the engine runs counterclockwise, so the starter should run clockwise for proper engine rotation (when working from the right side of the



Thunder Tigre .21 off-road engine provided overwhelming power.

IT'S NARLEY!

The Pacesetter 1/4 Scale Off Road Racer.

From Pacesetter Products comes the wildest off road car yet "The Grizzly". It's size, power, and durability make it the leader in 1/4 scale.

The Grizzly's size, 38" long, 21 1/2" wide, and 12 1/2" high combined with plenty of ground clearance make it able to attack almost any terrain.



High ground clearance and realistic appearance.

It's powered by an untameable easy pull start, 2 horsepower gas engine. The Grizzly

easily outruns the competition at 40-60 MPH.

The kit comes complete with standard features like a high strength chassis and aluminum suspension parts, coil over shocks, and spun aluminum wheels. Add your 2-channel radio a little gas, and go for it.

For more information on the Grizzly and other Pacesetter 1/4 scale cars send \$2.00 to:

Pacesetter Products
Garner Valley Box 257
Mountain Center,
CA 92361
714-659-2318

Or see your local hobby store.

Dealer inquiries invited.



It's big measuring 38" long, 21 1/2" wide, and 12 1/2" high.



Also available are the 1/4 scale Pacesetter sprint car (left), and the "Outlaw II" (right), prices start at

PACESETTER
PRODUCTS

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Prices and specifications may change without notice.

car). For this purpose, I used a 3 1/2-inch Kraft model airplane tire with the center hole opened up to allow it to slip over the starter cone. Once positioned, I glued it in place with Satellite City's* Hot Stuff.

I did all of my initial test runs with the body and roll cage assembly removed. This made it much easier for final dialing in of steering linkage, suspension, braking system, and anything else that might require adjustment.

PERFORMANCE. After operating



An electric starter with a doughnut-type rubber ring is needed to start any gas off-roader.

the Silver Fox through 8 or 9 tankfuls of fuel at slightly rich settings, I tweaked the needle for maximum power, throttled back to idle, and prepared to decimate the landscape, full-tilt boogie! The traction of this machine is uncanny! The chain-operated four-wheel-drive system pretty much makes you immune to such mundane obstacles as sand piles, water holes, wet grass, mud, and snow. If the engine keeps running after being doused, you're not likely to get stuck. With the

(Continued on page 74)

Track Report

Kyosho

O · P · T · I · M

**Faster than a speeding bullet—
Able to leap the roughest terrain in a single bound—
The Optima has it all!**



THE KYOSHO LINE of R/C kits, distributed by Great Planes Model Distributors*, includes everything from planes to cars and boats. Their car line has something to suit everyone's taste from the four-wheel-drive .21 gas-powered Integra Vanning to the

four-wheel-drive electric off-road Optima. The Optima was designed to be competitive on the racing circuit straight out of the box, but with the addition of the optional ball bearing kit and a hopped-up motor, championship performance can be expected.

THE KIT. The Optima comes attractively packaged

A



photos by Louis DeFrancesco, Jr.

in a large box covered with many full-color pictures of the car from various angles. All parts are well packed to prevent damage during shipping. The 31-page assembly manual is very complete and it contains all the information needed to build the car and much more. It has a table which explains the pros and cons of each of the different Kyosho chargers, it tells about the optional Kyosho LeMans motors, and it gives a good description of the recommended front and rear end adjustments. The radio installation section of the manual contains specific installation instructions by manufacturer and servo model for the most commonly used radios.

CONSTRUCTION. The assembly of the Optima is organized into 44 nicely illustrated steps which are explained in the manual. There is no need for me to comment about specific assembly steps, because the building instructions are so good and all parts fit very well.

The Optima's main chassis consists of eight aluminum pieces. These parts bolt together to form cages in the front and rear which enclose the gear boxes and are connected by two aluminum bars. The gear boxes are molded of fiber-filled nylon and house the differential in the front and the differential and some of the drive gears in the rear. The differential housings are also made of fiber-filled nylon and contain metal gears. Each differential is supported by two ball bearings. Power is transmitted to the front differential by a fully enclosed chain-drive system, which works well and is not subject to the wear that would occur with an open system. Two different differential gear ratios are provided so that the builder can vary the relative speeds of the front and rear wheels. I set up my car so that the front and rear wheels rotate at the same rate.

The front and rear suspension systems are constructed largely of fiber-filled nylon for strength and lightness. Both consist of extra-long double wishbones for handling uneven terrain with minimal effects on steering. Dampening is provided by coil-over oil-filled shocks on all four wheels. Both the front and rear suspensions have adjustable camber and ground clearance. Each of the front and rear axles are supported by two plastic bushings. Kyosho offers ball bearings as an option. The four tires are of a spiked design similar to those on most R/C off-road cars.

The radio control is mounted on a fiberglass plate, which also serves to stiffen the main chassis and hold the motor battery. Parts are provided to mount just about any of the common standard or mini servos. The resistor type speed controller provides three forward, one braking, and two reverse speeds. The controller also has a voltage step-down circuit so that the radio control can run

by DAVID TROST, M.D.

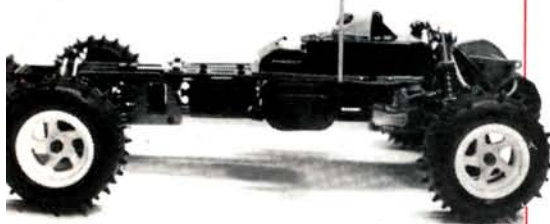
O . P . T . I . M . A

off of the 7.2-volt motor battery. I used a JR Circus* four-channel radio with two NES-505 servos in my car.

The motor and battery used for this review were the LeMans 480G and the Kyosho 6-cell, 1,200-mAh racing battery. The Optima comes with an RS 540 motor but I wanted to take advantage of one of the other powerplants available.

The Kyosho LeMans motors are modified, high-performance motors and there are six of them available. The LeMans model numbers are based on the motor's expected run time (in seconds) using a six-cell, 1,200-mAh battery pack. All of the LeMans series motors have adjustable timing, diamond-trued commutators, and coils potted in epoxy resin, and all of the motors except the 600E have dual ball bearings. The 480G also features a machined aluminum endbell for durability.

Optima chassis complete with radio installed, ready for body. Car is four-wheel drive.



The car is completed by trimming the clear polycarbonate body and driver/radio cover along marked lines and finishing them on the inside with paint. A



Above: New Kyosho Auto Charger provided plenty of juice. Below: Note ample suspension travel to handle the roughest terrain.



nice set of pressure-sensitive decals was provided for the outside. I used the Tamiya paint specially formulated for polycarbonate bodies.

A Kyosho Auto Charger was used to get the most out of the battery. This charger operates off of a 12-volt car battery and will charge any four- to six-cell, 100- to 4,000-mAh nickel-cadmium battery safely and automatically. You simply hook it up, press a button, set the desired charging current from 0 to 4 amp hours and let the charger do the rest. The built-in ammeter and voltmeter allow constant visual monitoring of charge status. The charger has a delta peak

automatic cut-off to ensure safe charges to 100% capacity.

I found this charger to be very easy and pleasurable to use. It consistently recharged the car battery from dead to full capacity in about 18 minutes.

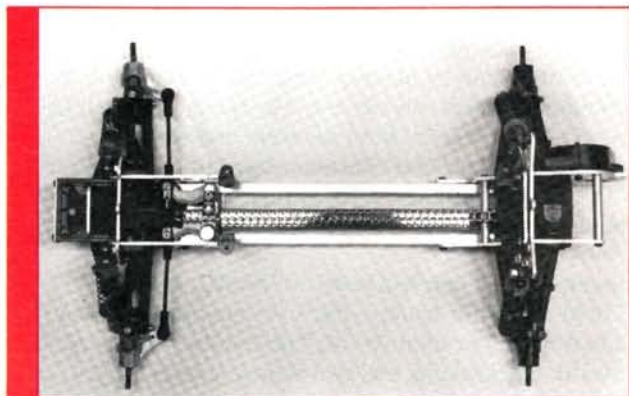
PERFORMANCE. Running the Optima is when the real fun begins. The car comes with two pinion gears (12 teeth and 15 teeth) to vary the car's speed/torque ratio. I used the 12-tooth gear almost exclusively to get the highest speed possible. I also advanced the motor timing 4°. The LeMans 480G motor accelerates the car quickly, and gives it a very fast top end. Motor runs were sometimes under eight minutes with the timing advanced 4°, so less advance may be desirable for competition races. The suspension easily handles rugged terrain and can absorb a 1-foot drop without a bounce. The steering is positive, even over rough ground. With its low center of gravity, the Optima corners very well with very little tendency to roll over.

The Kyosho Optima is an all-purpose R/C electric car. It's not only great for the fun-loving hobbyist who wants something to play with at the beach, but by adding a LeMans 480G motor and ball bearings, the Optima is a serious competition machine.

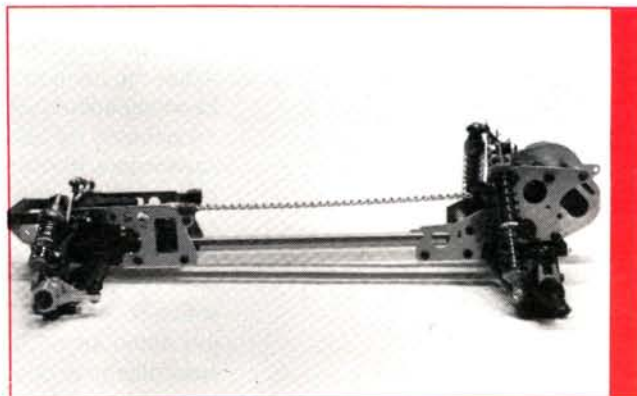
**The following are the addresses of the companies mentioned in this article:*

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109.



Top view of main aluminum chassis.



Side view; note strong chain drive.

Suspension Systems

by MIKE LEE

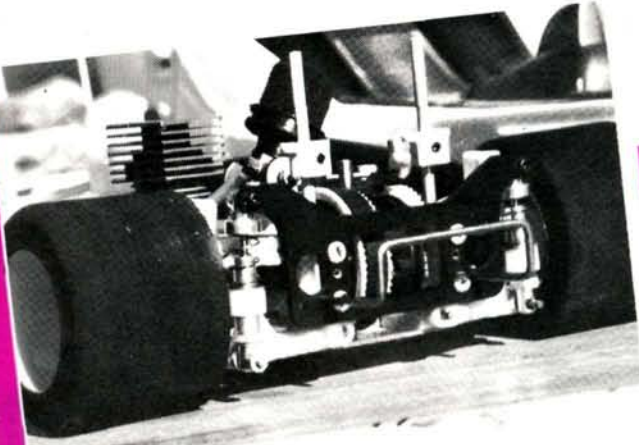
WELCOME again to "Suspension Systems," where the goal in driving is, and always will be, to keep the tires in contact with the road.

For those who were with me last issue, you might remember that I discussed the various types of suspension systems, components, and even a little history. This time let's talk about getting the absolute best from the suspension, working with it as it comes from the car kit.

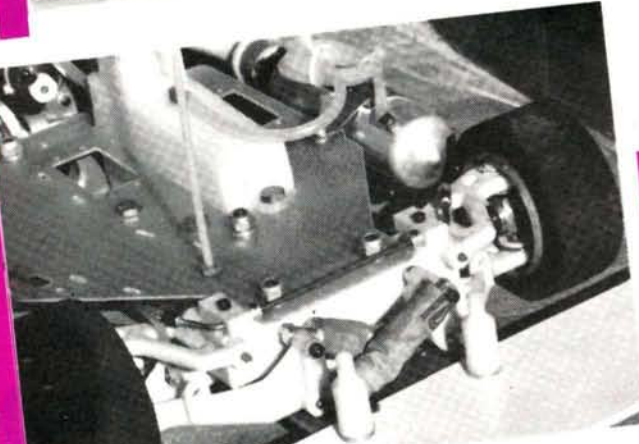
Kit suspension systems are generally pretty good, provided that the track you're running on is similar to the one the manufacturer had in mind when he designed the car. Most cars come with a suspension that should handle the average track under average conditions. Let's see how this affects us in the real world.

For road-racing enthusiasts, the ideal track is one smooth slab of asphalt that stretches a couple of hundred feet and has plenty of night lights. What we usually end up with is a parking lot that has seen the gauntlet with full-size cars and no lights. It has nice cracks, plenty of little dips, and so many yellow parking stripes that you would gladly use blue for track direction. Maybe it isn't that bad, but you get the picture.

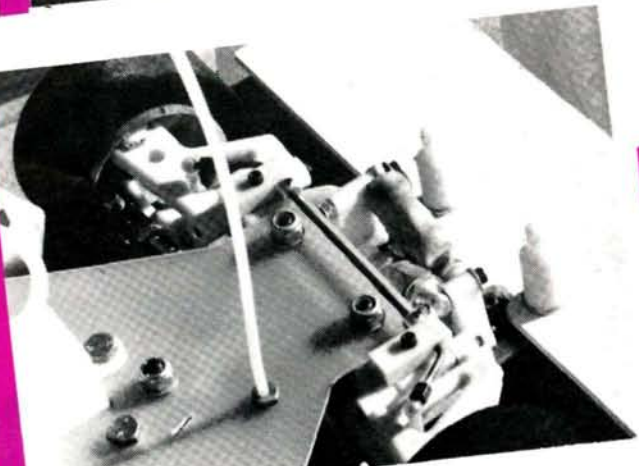
The off-road enthusiast is faced with an array of track conditions. If the track has been designed by local racers, it will probably be narrow and have obstacles that would trip up the Hulk. More established tracks, particularly those in Southern California, are fairly wide and sweeping tracks with good obstacles that most cars will negotiate without undue damage. On top of all this, there is no telling what the soil conditions are for any given track, and



Very complex but effective rear suspension on a road racing gas car. Note oil-filled shocks.



Front scissor suspension of 1/8 gas road racer shows sophistication in design.



Anti-roll or torque rod mounted on front suspension of a road racer. Although not really adjustable, differing sizes of anti-roll bars can be used to adjust the handling.

Suspension Systems



The common oil-filled shock with spring coil-over.

that is an important factor. But let's concentrate on the suspension first.

As you can see, the average track is very hard to define for the manufacturer. Therefore, the driver/mechanic has the task of suspension tuning his car. Let's start the tuning process from the very beginning when the car comes out of the box.

When assembling your new pride and joy, take care that the suspension is free to operate. Any moving part of the suspension should move without binding. Watch for excessive slop here too. Slop can make things worse than if the suspension were too tight. While you pride yourself on doing that good job, take note of how it feels when you work the suspension. And remember it! Later on, after running the car, you need to be able to make the suspension feel the same way. Note that this should be done with no load on the moving suspension arms, such as dampeners or torque rods.

Even under the best road racing conditions, dirt, dust, and grit will work their way into the moving parts of the suspension. In the off-road area, this is, at best, ten times worse, so it's imperative that the mechanic perform

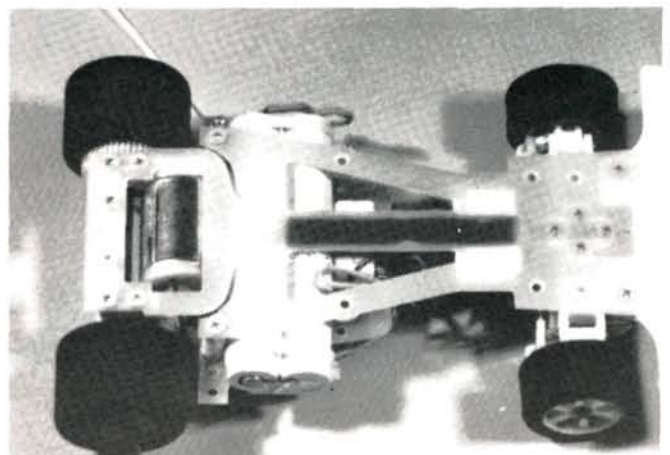
suspension maintenance every time the car is run. This is to ensure that the suspension is working as it should. If anything feels fishy, fix it immediately. What might seem a minor bit of drag on one wheel is really drag on all the wheels. Drag, or friction, is applied across the entire chassis, making the whole car suffer the consequences. Fix it now, not later.

Start tuning the suspension with the anti-roll bar, or torque rods. As I said in the last issue, the anti-roll bar is a rod linking the two front wheels or two

rear wheels to each other. The rod carries no load until the car negotiates a corner. As the car leans away from the turn, the inside wheel begins to lift and the outside wheel compresses. The car is moving on the roll axis, or rolling. The anti-roll bar takes the pressure from the outside wheel and tries to apply it to the inside wheel by transferring the torque. The result is that the car will resist the rolling movement through the turn and the inside wheel will maintain aggressive contact with the road surface. It's simple, yet very effective. The anti-roll bar appears in both road and off-road vehicles.

Tuning the anti-roll bar itself isn't possible, but using different sizes of anti-roll bars is an alternative. The bar is made of spring steel piano wire, and

Bottom of a 1/12 electric car shows the fiberglass flex chassis. Note the black chassis stiffener to prevent excessive fore and aft flexing.





On oil-filled shock, note the collar on top of the spring which is used to adjust spring tension.

can be bought in many different sizes. Purchase a couple of sizes over and under the size of the present bar and bend the new ones exactly like the original. Now you have new anti-roll bars to suit almost any track condition. Use the bar that best suits your taste. Just remember that we are intent on keeping the inside tire on the track. Too much effect from the bar will negate the front suspension movement and cause the steering to wash-out.

Now on to the dampeners. Remember those things that most of us call shocks? Tuning the oil-filled dampener is really a bit of a science. Most cars that use the oil-filled dampener also feature spring coil-overs in the dampeners to provide the full suspension effect. The aim is to make a perfect balance between the dampener and the springs in order to get the suspension to work for the driver.

First let's work on the springs. Getting the car to ride at the driver's desired height is the goal. The springs control this, for the most part, and setting them light or stiff will allow you to change the ride height when the

chassis is loaded. The other idea here is to keep the springs working for the car so it won't bottom out or rebound. That's where the dampener comes into play. The dampener prevents the springs from bottoming too fast by absorbing the shock, while at the same time preventing rebound by slowing the action of the spring on the return.

Tune the dampener with coil-over with the basic drop test. Holding the car about 1 foot from the ground, drop the car on all fours and listen carefully. What you are listening for is bottoming—that sharp whacking noise that comes when the chassis hits *terra firma*. If your ears deceive you, use carbon paper to confirm your hearing. Place the carbon paper under the car and drop it. If the chassis hits the deck, the carbon paper will leave a mark on the floor. What you *should* hear is a dull plop. That means the dampeners are picking up all the shock and the springs are kept from allowing bottoming.

Use your eyes as well. When the car is dropped, you should watch to see if it hops back into the air again, or

rebounds. If this happens to your car, then the oil in the dampener is probably too light. Change to a heavier oil, which will require that you reset the springs to accommodate the different oil weight, but the end result you're looking for is the same; a dull plop with no bottoming or rebounding.

Obviously, this drop test is a bit severe for a road racing car, and in this case, the drop test from a modified height is valid. Instead of dropping from 1 foot off the deck, pick the car up from the front end only and leave the rear tires in contact with the floor. Lift about 6 inches and drop. You should have the same old plop and no rebound. Treat the rear end the same way.

Don't forget that the suspension arms must be perfectly free to operate in order to get the right effect. And speaking of effect, we now go to the next suspension tuning item, the wing and air dam.

An air dam is simply an aerodynamic device attached to the body of the car which deflects the airflow over the body. A wing is also an aerodynamic device, not attached to the body, and also deflects airflow. The main difference is in the location. The wing is normally mounted at the rear of the body and above it, while the air dam is an extension of the body and can be on the front or the rear of the body.

Most folks look at a model car and think little of the aerodynamic effect of

Suspension Systems

the body. Most think the body is too small to make any difference. The truth is that anything will make a difference when it comes to airflow over the body. Prove it to yourself by hanging a piece of paper about 6 inches over the track. Watch the paper as the cars pass under it and you will see the amount of air that has been displaced by the body. That is the airflow and you can make it work to your advantage by deflecting it.

Air dams were meant to deflect air and prevent it from entering the front of the body. The normal position of the air dam is on the nose. You want to keep air from passing under the car in order to prevent lifting of the body. Lifting can cause the whole car to loft and become an airplane. This is bad for traction and for the chassis (what goes up must come down!). The air now travels around the body and therefore causes no lift. The displaced air is now traveling down the sides of the body. The mechanic should make the body as low to the ground as possible without allowing it to scrape. This keeps air from sliding in the sides and causing lift.

Finally, keep the rear end of the car completely open. This will allow whatever air is down there to be sucked out by the airflow over the top of the body. This effect causes a vacuum under the body, and the chassis is held to the ground. Racers of full-scale cars call this "the ground effect."

The wing is normally found on the rear of the body and is designed to provide downward pressure on the chassis, which results from the airflow over the top of it. For the most part, we need the downward pressure from the wing in the turns, but not in the straights. The car is normally stable in the straights, but here is where you must compromise on the amount of pressure coming from the wing.

The wing is bent at certain angles to satisfy the need for air pressure in the turns. However, this same pressure causes undue drag in the faster straights of the track. So, what you have to do is get the wing to give you all the air pressure you can get in the

turns, but not hold the car back when you're going down the straights. That's why the wing is mounted with spring steel piano wire. The piano wire will allow bending to the desired angle, but it's quite a chore to get it to bend. This reluctance to bend makes for a wing that doesn't change its angle if you roll the car, thus you retain the air pressure you wanted.



Wing deflection is personal choice, but it's well worth having in order to get the most in keeping the tires on the road.

An added feature of the wing for the off-road bunch is that it can cure the angle of flight when your dirt-burner jumps the big one. Many dirt cars are seen to take a jump only to land nose-first and lose time. Eventually, all this nose bumping takes its toll and front-end damage occurs. The wing can help cure this bad flying attitude.

By using the angle of the wing, the car can be made to sail over the jump evenly, without nosing over. This is provided the car is in good shape to make the jump in the first place. Use differing deflection angles on the wing to help get the car to jump right consistently.

For those who have cars with a flexible chassis and no movable suspension parts, don't despair; suspension tuning can be done.

Start with the chassis and watch it carefully to note any bottoming. A lightly-made chassis will flex more than a heavier or thicker chassis. If you find that your chassis does flex a bit too much, this can be easily cured by gluing a narrow strip of flexible material to the chassis, right where the most flexing occurs. Hot Stuff adhesive will provide for fast attachment of the material.

Use fiberglass, plastic, carbon-fiber reinforced glass, or any similar type

material. Use only a narrow strip at first and then drive the car. Add or subtract material to get the chassis to feel right to you. Just make sure the material is placed where it will not affect any other component.

The tires that come with most cars are considered medium hardness tires and will fit the average track. If you're like most of us, you'll find there are no average tracks around. But, by simply changing tire compounds, contact with the road surface can be improved. If you find your car breaking loose in the corners, try softer tires.

The use of softer tire compounds affords much better grip to the road surface and a softer ride. However, there is a price to be paid in the wear department for this higher traction. Softer tires wear faster because the rubber is more porous and there is less of it, making them shed more rubber when they are asked to bite down. Harder tires take longer to wear, but paying the price when the car spins out and hits a wall can easily exceed the cost of soft tires.

Tires can also be improved by dressing them. Dressing is when the rubber compound is treated with a liquid that makes the rubber softer and provides more bite. One of the more common tire dressings is a mixture of Oil of Wintergreen and glycerin. By mixing 25% Oil of Wintergreen with 75% glycerin and rubbing it into the tire, the rubber becomes squeezably soft and considerably increases tire bite. It also helps keep the rubber clean.

As you can see, tuning the suspension takes time and patience. There's more to the suspension than just the shocks, as anything on the car can be used to help out. The process can take days or even weeks, but the end result will be a car that is much easier to drive and one that will definitely help you see the winner's circle more often. No matter what kind of car you drive, remember that the goal is always the same—keep the tires in firm contact with the road.

Mike Lee, c/o *R/C Car Action*, 632 Danbury Rd., Wilton, CT 06897. ■

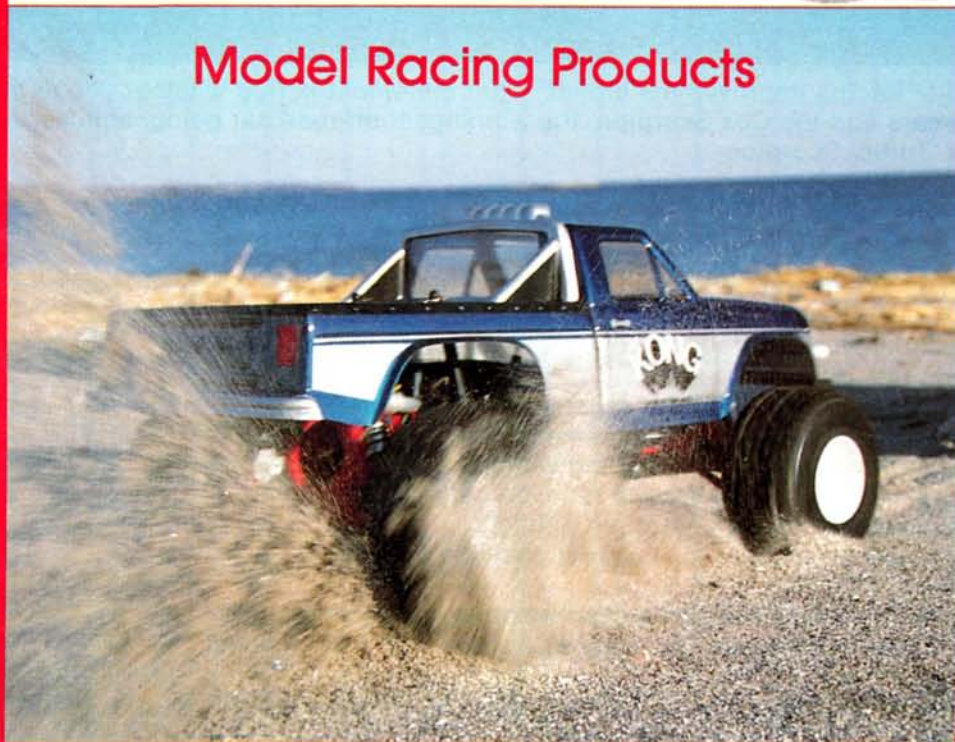
Track Report



KONG

THE KING OF KRUNCH!

Model Racing Products



photos by Louis DeFrancesco, Jr.

by STEVE POND

IF YOU'VE followed the world of four-wheel drive, you've undoubtedly heard of the infamous monster trucks. The reign of these incredible trucks began many years ago with the creation of Bob Chandler's Big Foot, which was created from the chassis of a Ford F250 pickup. After the addition of bullet-proof, 5-ton military axles, 66-inch Goodyear Terra tires, and a super-charged big-block powerplant, you have what is now the stepping stone of all monster trucks.

Chandler's monopoly of the monsters was challenged by the likes of Sampson, Godzilla, Bear Foot, Frankenstein, and an endless roster of others. For years this wild pack has been roaming the land, crushing rows of unexpected cars, and leaving a bevy of speechless spectators in their wake.

Such creations of pure insanity usually tax your bank account to the tune of a couple hundred thousand dollars, give or take a few thousand. But now, through the wizardry of R/C—or, more specifically, Model Racing Products—you can purchase one of these monsters in scale form for a mere fraction of the cost. MRP, a company that has been in the R/C business for about 13 years, began with the production of accessories for 1/8-scale gas cars. The accessories were followed by the production of 1/8-scale gas cars, then 1/12-scale electric cars, and a few years ago entered into the world of electric and gas boats. Now they have made an entry into the war of the mini-monsters. In conjunction with Hirobo, MRP manufactures a 1/10-scale version of a Ford F150 monster truck and they've named it "Kong."

THE KIT. The kit features full-time four-wheel drive with dual posi-loc differentials, huge semi-pneumatic tires, coil-over



Left: Lexan body after painting. Right: Neat packaging of monster Kong made assembly a breeze.



shocks and full four-wheel independent suspension. The kit includes all hardware necessary for completion, but there are other supplies needed. You need to supply a flat-head and a Phillips-head

screwdriver, needle-nose pliers, a good hobby knife, 3- and 4-mm nut drivers or sockets, a small hobby file, a good instant adhesive (Sheldon's Hobby Shop* Posi-Cure is a good choice), a screw locking agent (like Pacer's* Zap-Loc), and paints for the body. You will also need to supply a two-channel radio; a 7.2-volt, 6-cell battery pack; and a battery charger.



You can plow the "back 40" with this unstoppable monster!

CONSTRUCTION. Before beginning, I recommend becoming familiar with the abbreviations used in the instruction manual. For example, M2 is a 2-mm nut and M2x12PH is a screw 2-mm wide and 12-mm long (the "PH" stands for pan-head). Remember that it's imperative to use thread-locking agent on this or any other kit. Nuts and bolts can loosen and fall off, disabling your truck or car until you can order the parts.

Begin assembly by mounting the suspension arms. Before mounting them on the chassis, it's a good idea to screw the shock pivot ball onto the suspension arms. Slide the ball onto the 2x12 screw, then the M2 nut. Next attach the A-arms to the chassis. Assemble the knuckle arms, but before completing them, apply some grease to the driveshaft to prevent excessive wear.

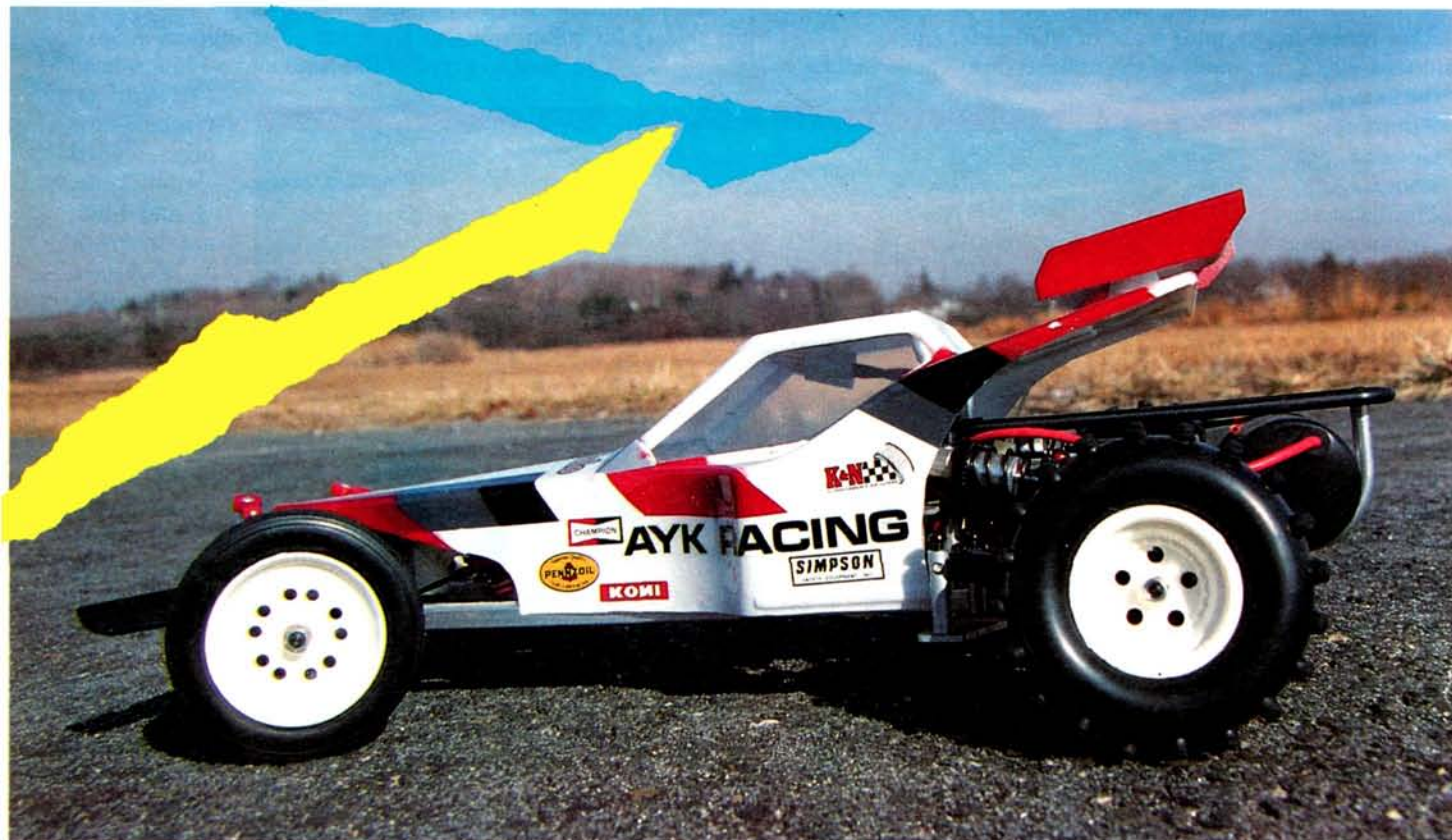
Assemble the rear axle, again using grease on the driveshafts. Follow this with the assembly of the front and

(Continued on page 63)

Track Report

AYK RACING USA

Buffalo



THE WATER BUFFALO is considered to be the most powerful animal of its kind. Untamed, the Buffalo is a very temperamental beast,

capable of slaying even the king of the jungle. Due to its great size and power, it has the ability to drudge through water-covered ground. Even tame, the Buffalo can be seen plowing through rice fields with its head held low and its nose thrusting forward as it steadily pulls a cultivator that would hold a 4x4 like an anchor. With the characteristics of this intrepid animal in mind, the people of AYK Racing USA* have designed one of the most simple, yet durable, R/C cars to date.

I have built ten different R/C cars, ranging from 1/4-scale off-road gas cars to 1/12-scale electric carpet racers.

Assembling these things can be a little hair-raising at times, and I've been waiting for the day these cars come assembled. It would make my job so much easier.

By HENRY KLEIN

Sock it to 'em with this ready-built off-roader!

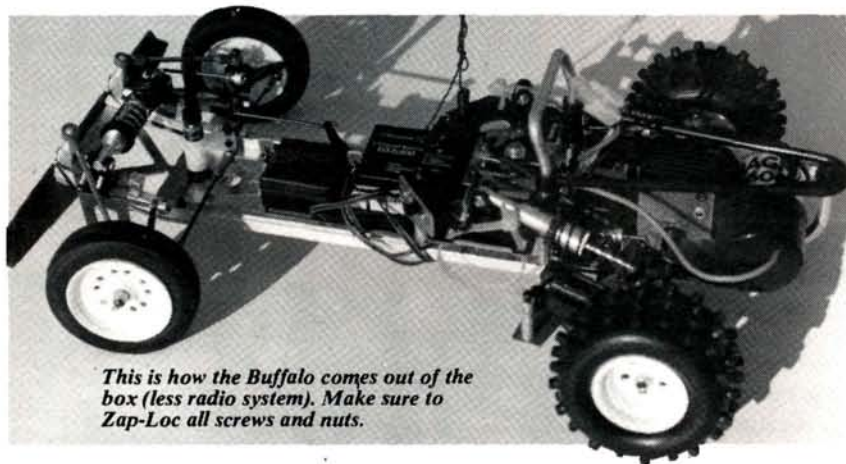
My prayers have been answered by AYK Racing. Their pre-assembled, 1/10-scale off-road electric racer sports the name "Buffalo," and it's not only an answer to my prayers, it's also the ultimate beginner car.

THE KIT. The kit features oversize oil-dampened shocks (transverse mono shock in front, semi-trailing arms with laid-down mounted shocks in the rear), front and rear anti-sway bars, lightweight aluminum alloy ladder frame, four-wheel independent suspension, and an impact-resistant clear Lexan body.

You'll need some other equipment to get the Buffalo

ready to race, the most important being a radio. For this review, I chose to go with Tower Hobbies* Astro GXR 202 radio. This is an inexpensive, durable radio which is more than adequate for this application.

Next, you need a battery charger. I usually go for the AC/DC type for two reasons. First, constant quick charges are not good for a battery. When a battery is excessively quick-charged, it tends to overheat, thus causing it not to accept a full charge and maybe causing damage to the battery. The second reason is that when a charger is not adaptable to an AC outlet, it's usually not capable of trickle-charging. For these reasons, I chose the new Mark III Deluxe nickel-cadmium battery charger from Texson Precision Products*. The Mark III is an AC/DC variable rate charger, which means it's capable of charging four-cell 250-mA to seven-cell 1,200-mA batteries. The Mark III is capable of charging, discharging, quick-charging, and trickle-charging. To round out the package I used a



This is how the Buffalo comes out of the box (less radio system). Make sure to Zap-Loc all screws and nuts.

Turbo Pack battery also from Texson. I already had the tools necessary to do what little assembly there is, but if you don't have them, you'll need a Phillips-head screwdriver, needle-nose pliers, scissors, a hobby knife, a thread-locking compound such as Pacer's* Zap-Loc, an instant adhesive such as Pacer's Zap-Ca, acrylic paint, and a brush.

CONSTRUCTION. For me to go through an entire construction treatise would be ridiculous; the car is almost finished right out of the box! Also, the instruction manual is fabulous; every step is clearly spelled out, leaving nothing to speculation, and if that's not enough, there are first-rate diagrams for each step. Because of all this help, I'll just go over a few steps here.

To start the minimal assembly, first mount and adjust the steering servo and the controller servo. For this step I recommend using nuts and bolts to secure the servo for the sake of more precise speed control, but the nylon band will suffice.

Next install the motor and wiring. The Buffalo kit includes an AYK Racing Magnum 600 motor. AYK also offers a variety of different motors for different applications. They have motors for every aspect of off-road racing, from sprint to endurance.

Install the receiver, switch, and battery case. The next step is simply to install the battery pack. Here I eliminated the nylon bands because I normally use two battery packs. While one battery is in

use, the other is charging. Eliminate the nylon bands and use a thick rubber band; it's much cheaper than replacing the nylon bands every time the battery is changed. If you choose to go with only one battery, then it's fine to use the nylon bands.

In the manual, there is an exploded-view of the differential showing how the shimming of the bevel gears is accomplished. Don't let this frighten you, as it's actually quite simple. I found the wording for this step a little confusing but the purpose is clear. By placing the washers on the differential shafts, it moves the 22T bevel gears in closer to the 16T, creating a better "mesh." Before assembling, put a little petroleum jelly on all the gears to prevent premature wear.

Now it's time to put the oil in the shocks. This is also a very simple step if performed with a little patience and composure. Remove the shocks via the C-clips used to retain them. Do this in the middle of a clean workbench or table, not on your cluttered desk; those C-clips have a nasty tendency to fly. Put oil in the shocks per the diagram and reassemble. Before replacing the springs on the shocks, save yourself the trouble of having to take the shocks back out again. After I remounted the shocks, a simple test of the suspension was in order. By pushing on the front and rear of the car with my fingers, I compressed the suspension. Upon releasing it, I found the spring tension to be a little too weak to return the car to its original ride height. The cure for this is very simple and takes all of 30 seconds. First establish the length of the springs by standing them up on a table and measuring them with a ruler. Once this is complete, stretch the spring until it measures 1 inch longer than the previous measurement and install.

(Continued on page 95)

Track Report

MRC-Tamiya

The Fox

by DAVID TROST

IMAGINE A STOCK electric off-road buggy that can go 80 feet from a standing start in just 3.5 seconds. You might say that it's a fantasy, but Tamiya has produced just such a car. The Fox is the latest offering from the prolific designers at Tamiya and it's distributed by Model Rectifier Corporation*. They are so sure that the Fox is the fastest R/C buggy on the market that they've challenged other manufacturers to beat their claim. I have to admit that when I first received the Fox, I was a bit skeptical myself, but I'm not any more.

THE KIT. The Fox comes packed in a box with full-color drawings of the car. All parts are attractively arranged in bags or blister packs. The quality of the parts in this kit is outstanding. You never have to worry about parts not fitting in a Tamiya kit; it simply doesn't happen. The plastic trees are individually bagged to prevent damage during shipping. All small hardware is organized in bags which bear tags with full-size line drawings of each part.

The 20-page instruction booklet is one of the best I've ever seen. It contains a list of all the tools and equipment needed to complete the car, the assembly steps, and a nice section on troubleshooting any problems that might arise. The manual breaks the assembly down into 38 steps, each fully illustrated and more than adequately documented.

There's really no need for me to go through the step-by-step assembly of the Fox because the manual is so good. What I *will* do is describe in some depth the features of the car.

The basic chassis is composed of two plastic shells which completely enclose the radio gear. The radio gear is installed very early in construction and the two chassis pieces are screwed together. This assembly forms the backbone of the car and all other assemblies are added to it during construction. This arrangement makes for a strong, water- and dust-proof radio box/chassis, but it also makes it difficult to get to the radio gear when it needs service or adjustment, since a fair portion of the car must be disassembled to reopen the radio box. There are rubber seals on the switch, the



For speed, handling



steering arm, and the wire entering and exiting the radio box to protect the radio from the elements.

The radio I used for this review was the ACOMS Techniplus two-channel radio-control system from Altech Marketing*. It has a basic two-stick, dry-cell transmitter which feels good in the hands. The stick assemblies are smooth and the servo response is very linear. The receiver is small and will fit into any car with ease.



And looks, the Fox is way ahead of the hounds!



The servos are standard size and feature tough gears and a water-resistant case, making them well-suited for R/C buggies. The servos have fairly good centering, torque, and speed. The Fox is set up to run the radio off of the motor battery through a voltage step-down circuit. This circuit replaces the radio battery case and switch, and plugs directly into the motor speed controller. The battery eliminator isn't included in the kit and must be purchased

separately. It's available with connectors to fit most major brand radios.

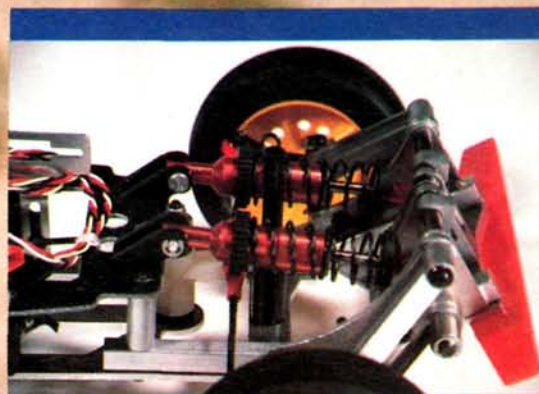
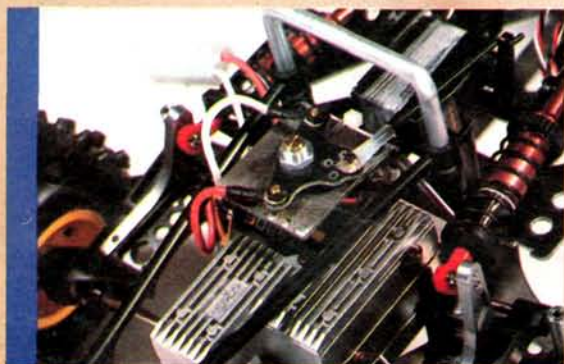
The ACOMS radio fit perfectly in the Fox. I usually find radio installation one of the most annoying jobs in building a car. I don't like having to fiddle with servo arm lengths, positions, and linkage adjustments. However, the design of the Fox is so well thought out and the instructions are so

(Continued on page 74)



Track Report

One tough R/C reptile!



Circus Hobbies

Gator

by RICH HEMSTREET



THERE ARE SO many off-road racers that it's hard to know which one to start with. Well, if you're just entering the sport, you should check out the Gator by AYK and distributed by Circus Hobbies*.

THE KIT. The Gator is a 1/10-scale off-road racer. The kit is complete except for a two-channel radio and a 7.2-volt battery pack. The 12-page instruction and assembly manual clearly lists which tools are required for assembly.

A clear Lexan body is included in the kit, along with a colorful decal

sheet for detailing the car after painting. The chassis is made of aluminum. The Gator has fully independent suspension and there are four large coil-over shocks, one at each wheel. Knobby rear tires and grooved front tires are supplied.

An AYK GZ 480B motor is standard with the car. The three-speed controller also has reverse. A sealed gear case protects the differential.

ASSEMBLY. When you open the box, you find the Gator almost fully assembled. However, don't stick your radio and battery in the car and run for the dirt. There is a warning attached to the parts diagram: "All screws and nuts are finger tight and should be tightened and secured" with a locking compound. I suggest Pacer's* Zap Lock. While you should avoid shaking hands with whomever left those screws "finger tight," you can be sure that something will fall off if you skip this step. It takes a while to tighten the many screws, but this is far easier for a beginner than assembling a box full of seemingly-unrelated parts.

The shocks have to be removed from the car and disassembled so you can fill them with oil, which is included in the kit.

The instructions are very clear about installing the radio and hooking up the steering and throttle linkages. Universal brackets are included for mounting the steering servo.

The tires have to be glued to their wheel rims. You have to open the gear case to adjust the meshing of the gears, and you must also lubricate the gears at this time.

The Gator has bushings all around. If you keep them clean and oiled, they will perform almost as well as bearings. If you abuse your bushings, it's likely you would abuse bearings.

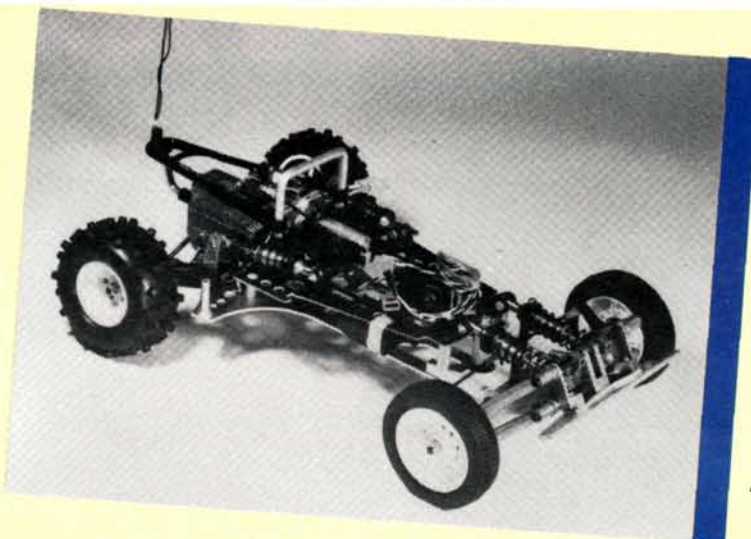
I wired the radio straight to the main power supply. There's no need for a separate receiver pack, which will only weigh the car down. Rather than using the receiver On/Off switch, I just plug the receiver in to turn it on.

The Lexan body was easy to paint and mount. There were plenty of decals to make for a colorful car.

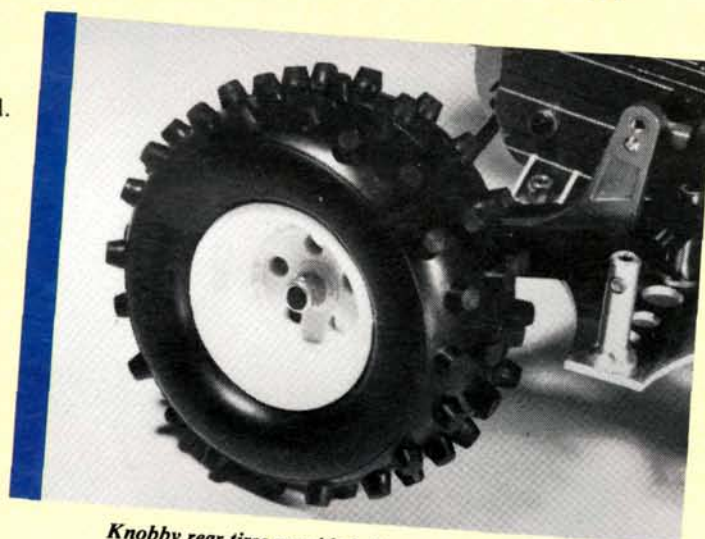
PERFORMANCE. The car responds very well to the driver's input. The three-speed rheostat provides a very usable range of control.

The four shocks are all inboard so they are protected from damage and dirt accumulation. Each shock's coil spring rate can be adjusted separately. This is ideal so you can dial-in your handling very carefully.

The ride height in the front is also independently adjustable. If you are running an oval, you can drop the left front of the chassis and stiffen the right



Gator comes pre-assembled. Note radio installation.



Knobby rear tires provided plenty of traction.

side springs for better tracking through curves. You can also use the ride height adjustment to control oversteer and understeer to counteract changing track conditions, or when racing on different tracks. If you change the front ride height, realign the toe-in of the front tires.

The Gator is a solid car that should give the beginner a good starting point. While the suspension can be dialed in precisely, there are few adjusting points to deal with. The Gator will give you lots of fun for a small investment, as you learn how to tune a car for optimum performance. Speaking of performance, the Gator won't disappoint even a dyed-in-the-wool R/C speed freak. Acceleration is swift and the car is most responsive. It has exceptionally good traction when confronted with all those off-road nasties such as mud and deep sand, plus it handles jumps well.

So, you don't have to go to the Florida Everglades to get a tough 'gator, just order one from Circus!

**The following are addresses of companies mentioned: Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109. Pacer, 1600 Dell Ave., Campbell, CA 95008.*



Unreal 1/4-scale nitro-burning monsters!

R/C Funny Car

by CORY SAVAGE

MY OBSESSION with drag racing began when I was eight years old. Twenty years and hundreds of drag races later, I found a way to get out of the grandstands and pursue a new direction in the sport. By combining my interest in R/C racing with my love for drag cars, I set out to build the first 1/4-scale radio-controlled funny car, "Ragin' Red." I discussed my plans with Jeff Schmidt of Pacesetter Products*, the originator of 1/4-scale race cars, and I commissioned him to assemble a basic rolling chassis, complete with a welded aluminum tube frame, a Futaba four-channel radio, an A-arm





front suspension, a powerful Picco .90 marine engine, a quick-change gear box to get the power to the ground, and a unique transmission that enables the car to back up after a long, smoky burnout.

While Jeff worked on his projects, I spent two months sculpting the plug for a Corvette body out of foam. After the mold was made and a fiberglass body was pulled, I began the final construction and detailing. Ragin' Red is loaded with details: a servo-controlled scoop, a scale parachute, and a functioning eight-pipe exhaust system for dumping the nitro exhaust fumes. Countless hours were spent polishing every polishable part. Interior panels were fabricated and black anodized. You'll even find a hand-formed aluminum gas tank and braided steel fuel lines to complete the replication of the real thing.



age is a true craftsman in the art of model
Note fantastic air brush work and scale
These monsters are capable of speeds in
100 mph!



AA/Funny Car, Pale Racer. Is it full-scale or the model?

Painting and detailing the body were the final steps toward completing Ragin' Red. I applied several coats of acrylic lacquer and spent hours hand-rubbing to achieve a beautiful high-gloss finish.

My desire to develop a team of 1/4-scale drag cars grew as work on Ragin' Red came to an end. This idea grew into the development of cars that are pure racing machines rather than the impressively detailed replica that Ragin' Red is.

A 1/4-scale top fuel dragster, "Secret Weapon," and a second funny car, the "Pale Racer" Firebird, are the first prototypes. Built for optimum speed, they consist of simple aluminum and fiberglass frames powered by 3 horsepower chainsaw engines and fiberglass bodies. Pacesetter Products sells these cars in either kits or assembled and ready to run.

As interest grows in 1/4-scale drag racing, there are hopes of organizing an association and having monthly races. So, drag racing fans, here's your chance to really get into the





The mind-blowing top fuel dragster, Secret Weapon, is powered by a chainsaw engine.

PALE RACER

Type: AA/Funny car
 Make: 1986 Firebird Trans Am
 Scale: 1/4
 Length: 61 inches
 Wheelbase: 31 1/4 inches
 Height: 12 inches
 Channels: 4
 Radio: Futaba
 Brakes: Drum
 Suspension: Rigid, front and rear
 Body: Fiberglass
 Paint: Acrylic enamel
 Total Weight: 20 pounds
 Engine: McCulloch
 Displacement: 2.0 cubic inch
 Fuel: 20:1 oil/gas
 Horsepower: 3
 RPM: 8,500
 Cooling: Air
 Clutch: Centrifugal
 Drive: Chain
 Sponsor: Savage/Gaudet Design

driver's seat without all the risk, time, and expense of the full-size cars.

For me the obsession continues with work on a 1/4-scale fuel-altered Thunderbird pro stocker. Still on the drawing board are future plans for a

SECRET WEAPON

Type: Top Fuel Dragster
 Scale: 1/4
 Length: 7 feet
 Wheelbase: 63 3/4 inches
 Height: 25 inches to top of wing
 Channels: 4
 Radio: Futaba
 Brakes: Drum
 Suspension: Rigid, front and rear
 Body: Fiberglass
 Paint: Acrylic enamel
 Total Weight: 15 pounds
 Engine: Zenoah
 Displacement: 2.2 cubic inch
 Fuel: 20:1 oil/gas
 Horsepower: 3
 RPM: 8,500
 Cooling: Air
 Clutch: Teflon centrifugal
 Drive: Quick-change gear box
 Sponsor: Savage/Gaudet Design

1/4-scale, triple jet engine semi with smoke and fire show. So look out, drag world, the 1/4-scale racers are coming.

**The following is the address of the company mentioned in this article:*

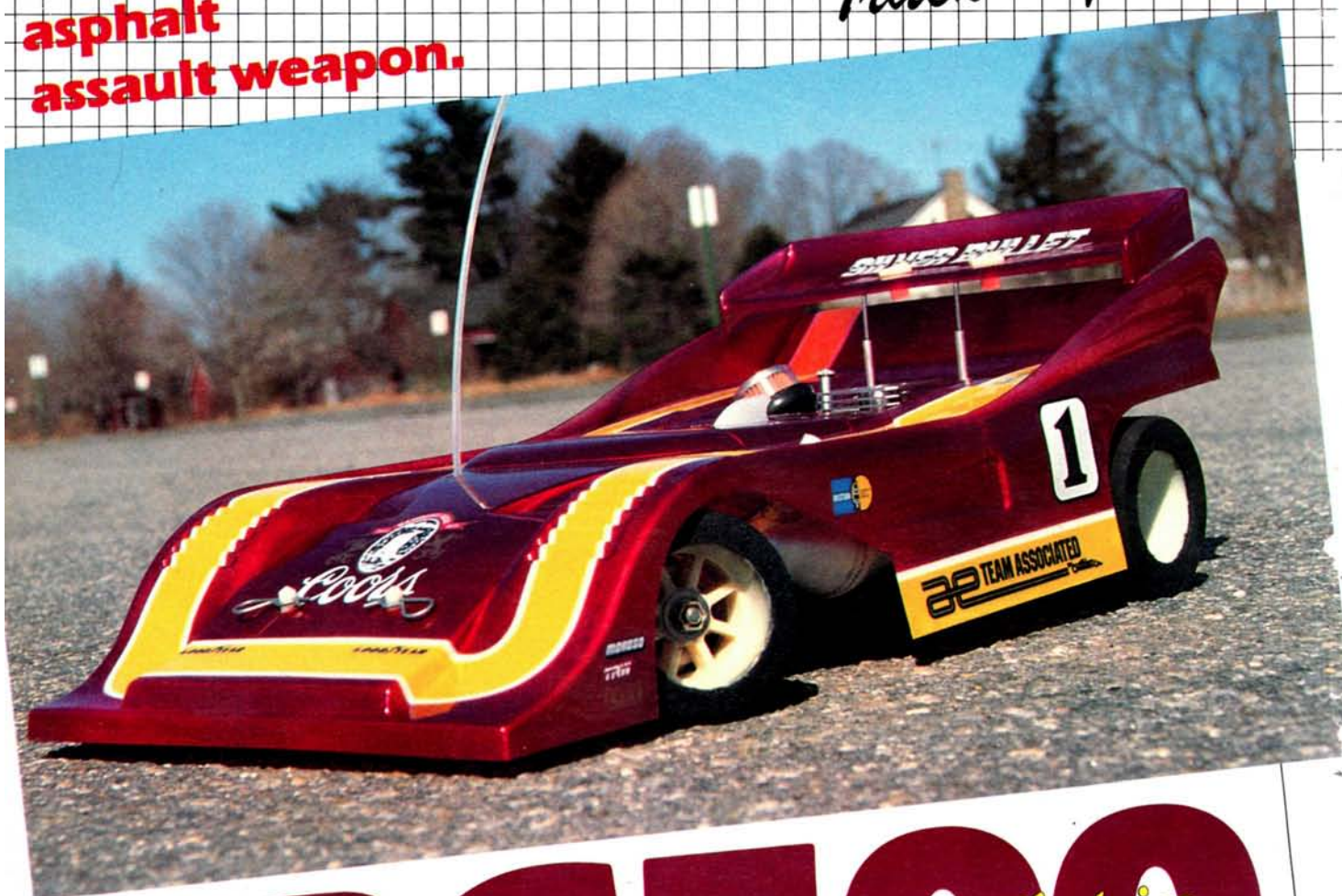
*Pacesetter Products, P.O. Box 257,
 Mountain Center, CA 92361;
 714-659-2318.*

RAGIN' RED

Type: AA/Funny car
 Make: 1986 Corvette
 Scale: 1/4
 Length: 52 inches
 Wheelbase: 31 1/4 inches
 Height: 12 inches
 Channels: 4
 Radio: Futaba
 Brakes: Drum
 Suspension: Rigid rear, A-arm front
 Body: Fiberglass
 Paint: Acrylic lacquer
 Total weight: 35 pounds
 Engine: Picco
 Displacement: .90 (15cc)
 Fuel: Nitro
 Horsepower: 8
 RPM: 26,000
 Cooling: Internal water
 Clutch: Teflon centrifugal
 Drive: Quick-change gear box
 Sponsor: Savage/Gaudet Design

**The ultimate
asphalt
assault weapon.**

Track Report



RC500

Associated Electrics

by STEVE POND

I'M GOING TO START this review with a little word association game. When you hear the words "best," "fastest," and "world champion," what do you think of? I generally think of the Team Associated* RC500. For years the RC500 has been gracing race tracks throughout the world with its incredible performances, leaving the competition in the dust. If you won't take my word for it, take a look at the list of winners in any given race. I guarantee they will be littered with the name "Team Associated." This is no accident. The RC500 is the ultimate asphalt assault weapon and it's the result of years of research and extensive testing.

THE KIT. I'm presenting the RC500 in stock form and there are two reasons for this: first, this is my first effort at building a competitive 1/8-scale race car and I'd rather learn the basics before jumping head-first into a full-blown modified. Second, to collect the information necessary to build a competitive modified would take weeks. I'd also like to thank Gene Hustings and Team Associated, for without them this review would not have been possible.

I'll tell you right now that this is no easy project. You can't expect a car of this caliber to be a "snap together." It takes some time to build, and the more time and care you take on the workbench, the more it will reflect on the car's performance on the track, so don't rush it.

To construct the RC500 you'll need a set of Allen-head wrenches, Phillips-head screwdrivers, an X-Acto knife, needle-nose pliers, C-clip pliers, wire cutters, a wire bender, assorted drill bits, thread-locking compound, and, most important, a Dremel tool. A drill might suffice but for the best results a Dremel is the way to go.

Before beginning, clean your workbench and the surrounding area. If you should drop a small part during construction, it will be a lot easier to find on a clean floor.

CONSTRUCTION. Assembly begins with the front end. Instead of leading you through the entire manual, I'll touch on the points that need a little extra attention. Following the instructions carefully, complete steps 1 and 2. For step 3, I recommend using Pacer's* Zap-Loc thread-locking compound on the setscrews.

I chose to use a Dremel tool for step 4. If you do the same, be careful not to make the hole opening any bigger up and down or you'll lose the full effect of the anti-roll bar. On steps 5 and 6 I again used a Dremel tool to save time.

In step 7 you're given the option of polishing the ball ends on the steering blocks for smoother operation; do it! Remember, all the driving skill in the world will not help if your car isn't well prepared. Now complete steps 8 through 14.

Steps 15 through 21 are for shocks used in previous RC500 kits. The kit now comes with the new #5136 custom racing



shocks along with instructions for assembly. Be cautious when mounting the shocks; over-tightening will cause them to bind.

Assemble and install the servo saver next. I assembled it, but chose to leave it on the side until it was time to assemble the chassis.

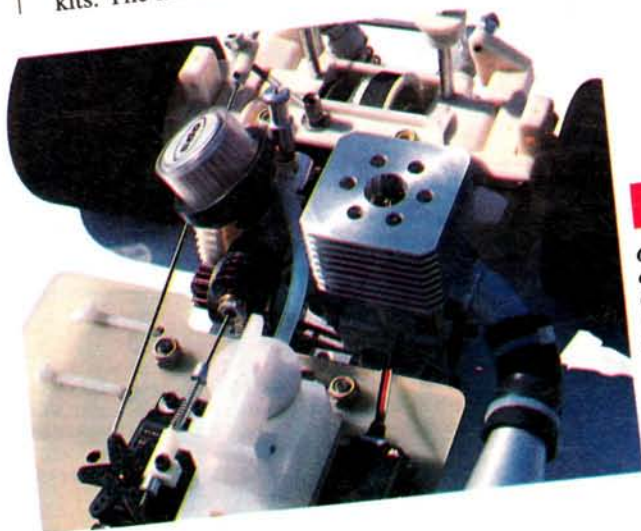
Now complete steps 23, 24, and 25. I found out that the kit now comes with a trick belt-drive system that replaces the chain and sprockets pictured in steps 26, 58, and 67. The purpose for this is to reduce the rotating mass to provide for better acceleration. If you already have an RC500, you can simply purchase the conversion kit. For those of you with the belt-drive, just assemble it per the instructions.

Step 40 begins the assembly of the rear end. This series of steps was no problem at all due to excellent instructions, so I'll just give a few pointers. When checking for clearance on the bottom of the brake shoe, install the lower bearing for the brake cam to see if this will interfere. I had the steel brake conversion which is much better than the fiberglass. Even though the steel is heavier than the fiberglass, it's almost impossible to get a piece of fiberglass perfectly smooth and free of high spots. Without a smooth brake rotor you won't have the flawless braking needed to beat the competition.

Now complete steps 47 through 56. As I mentioned, the car uses a belt-drive system, so instead of using the chain (steps 57, 58, and 59), simply replace it with the belt.

Complete steps 60 and 61 next. For step 62, I recommend checking for clearance between the brake bracket and the belt. If it doesn't fit, trim it with an X-Acto knife for proper clearance. Before completing step 64, refer to the diagram which outlines the installation of the alignment pins for the brake rotors.

(continued on page 76)



Combination of K&B .21 car engine and OPS carb proved potent and reliable.

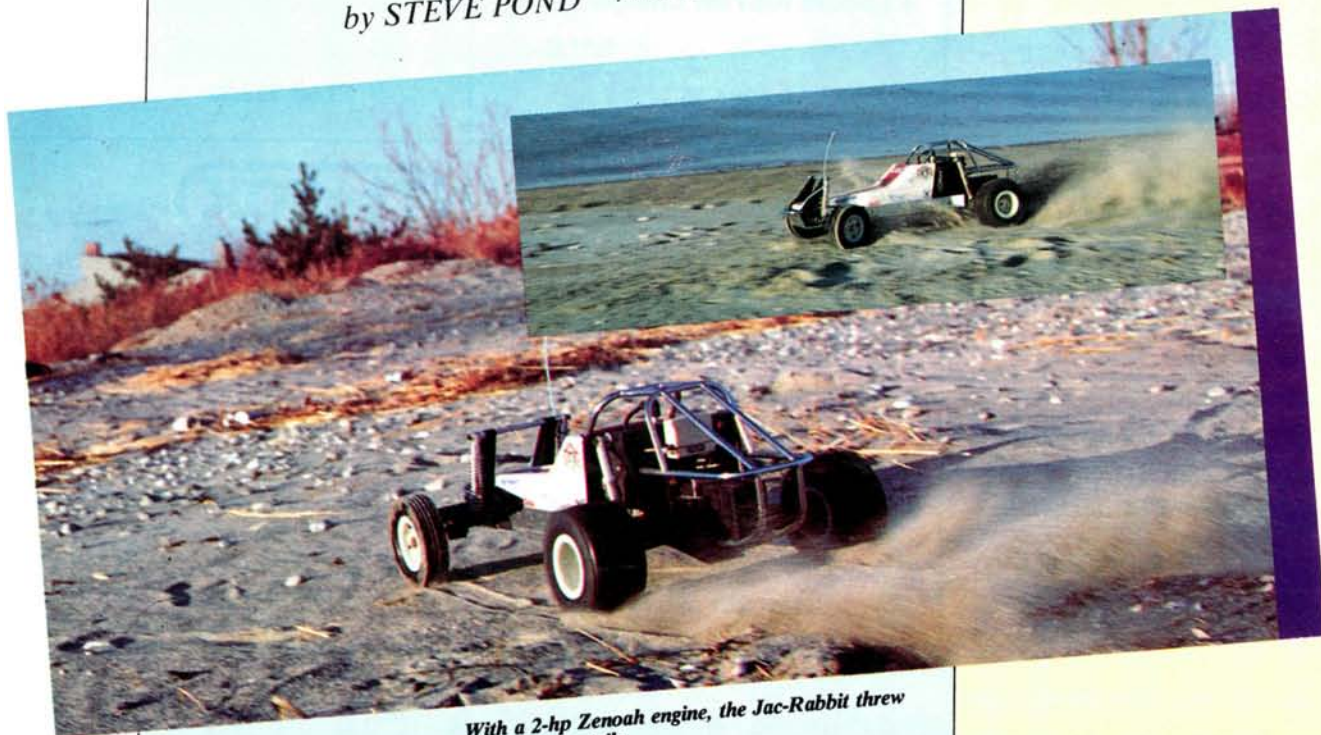
Track Report



RACO **Jac-Rabbit**

by STEVE POND photos by Louis DeFrancesco, Jr.

**Kick some tails
with the nastiest
gas off-roader yet!**



*With a 2-hp Zenoah engine, the Jac-Rabbit threw
4-foot rooster tails.*

I'M SURE YOU'VE HEARD about the race between the tortoise and the hare. Because the tortoise was not capable of matching the blinding speed of the hare, he devised a plan to overcome this; his plan was to maintain a steady speed throughout the race to avoid refueling. The rabbit, on the other hand, figured that he could sprint from place to place, stop to refuel more often, and beat the tortoise.

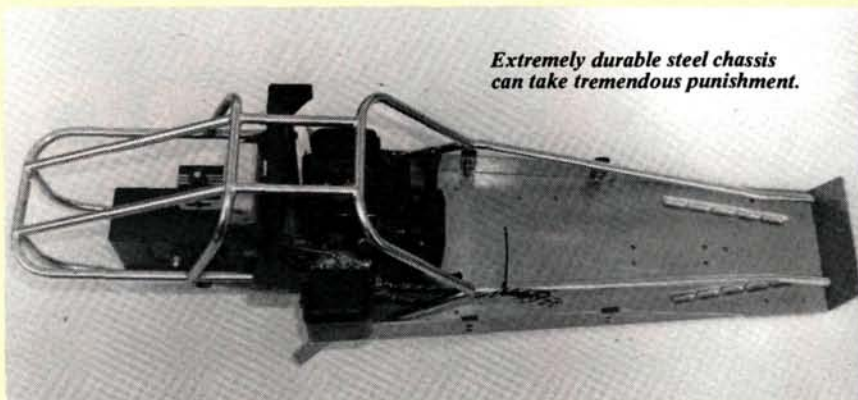
You know how the race turned out. The wasteful tactics of the hare could not overcome the well-thought-out plan of the tortoise and the tortoise went home with the trophy. With this in mind, the engineers at Raco Modelcraft* went to work to try to find a better competitor for the tortoise. They finally came up with something that would turn the tortoise on its back; it's a new breed called the Jac-Rabbit.

THE KIT. The Jac-Rabbit is designed with the cunning of the tortoise and the speed and agility of the hare. This new breed of racer has an impressive list of features, which includes fully-adjustable four-wheel independent suspension with coil-over oil-dampened shocks and race-proven trailing arms at all corners. The engine is a Zenoah Max-Power 1.4 cid, which has a solid-state transistor ignition, an all-position diaphragm carburetor, fan cooling, a chrome-plated cylinder, and a quiet tone muffler. The engine also has an on-board starter, which eliminates the need for expensive starters. And if that's not enough, the engine runs on regular fuel and two-cycle oil, so kiss the exotic and expensive fuels goodbye.

The Jac-Rabbit has other features, such as a fully enclosed centrifugal clutch, all gear drives, disc brakes, heavy-duty hi-load servos, heavy-duty precision sealed ball bearings, and semi-pneumatic neoprene tires mounted on

reversible three-piece wheels. Did you buy one yet?

CONSTRUCTION. Most of you are probably saying "twice as big, twice as hard to build." *Wrong!* This is as easy to build as any 1/10-scale beginner car. In fact, it's easier because not only is it more than halfway finished from the factory, but it's bigger so you don't need fingers that resemble tweezers. To complete the Jac-Rabbit you'll



Extremely durable steel chassis can take tremendous punishment.

need 5/32 and 7/64 Allen wrenches, and 3/8, 7/16, and 9/16 open-end wrenches. The other supplies you need are paint, a two-channel radio, four sub-C size nickel-cadmium rechargeable batteries, and a fifteen-minute quick charger.

First paint the body and chassis. This can be done now because there are no modifications needed on the body. I chose not to paint the chassis because I like the look of aluminum and it would probably get scratched the first time out anyway. When the body paint had dried, I added the decals supplied with the kit. The decals included are from Autographics*. If the decals supplied are not suitable for the paint scheme you've chosen, you can choose from the wide variety of other beautifully detailed decals that include some of the biggest sponsors in the racing world.

Now it's time to begin the construction. It's not necessary for me to rewrite the entire instruction manual because each step is completely explained and is accompanied with a photograph. I'll just touch on each step and give a little advice along the way.

Assemble the rear suspension and install the ignition module. Locking nuts are supplied to fasten the ignition module, but for all other fasteners I highly recommend using a thread-locking compound like Pacer's Zap-Loc.

Next assemble the front suspension and chassis. Exercise a little care when tightening a screw into a nylon or plastic part because these are very easy to strip if you're not paying attention. You'll need snap-ring pliers for this step. I tried to get the snap rings on with a screwdriver but the time and aggravation spent to do this was well worth a pair of snap ring pliers. They will also be needed to remove and install the half shafts if any maintenance is required.

Install the front shocks and spindles. This step is spelled out very well and should be no problem.

(Continued on page 97)



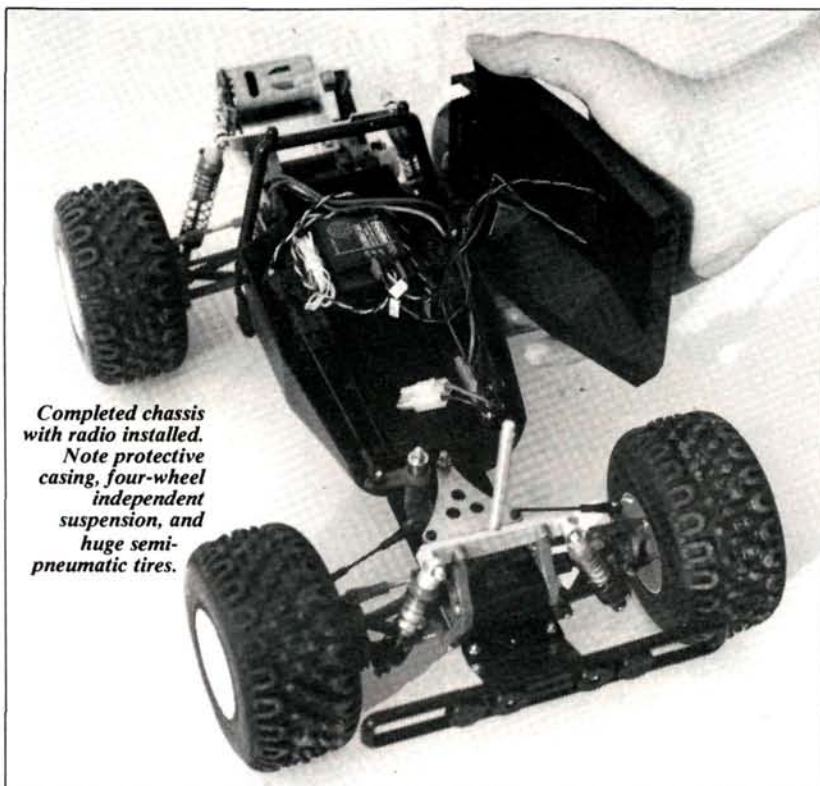
Radio transmission was supplied by Airtronics XL2P Pistol Grip.

KONG

(Continued from page 41)

rear suspension (steps 4 and 5). Mounting the belt covers (steps 6 and 7) was already completed on my model, with the exception of the brace between the front differential and the radio box. Before going any further, there is a list of simple intermediate checks to make. Once complete, move on to step 9 and put oil in the shocks. Now I usually attack these kits because I want to finish them as soon as possible, but this is one step I take my time on. I learned my lesson the hard way. On one kit I constructed, I didn't take the time to bleed the excess oil out of the shock, which made it impossible for the shock to compress, thus bending the shaft. A lack of oil isn't any better as it will cause the truck to bounce repeatedly on rough terrain, resulting in a loss of traction. After bleeding the oil from the shock, tighten the cylinder cap with a pair of needle-nose pliers to prevent leaks.

Next mount the shocks on the chassis. I found that it's easier to assemble the shock mount before mounting the shocks. When I attached the shock mount, the directions led me to believe that



Completed chassis with radio installed. Note protective casing, four-wheel independent suspension, and huge semi-pneumatic tires.

it was to be fastened with 4-40x1/2-inch fasteners. After an hour or so of trying to find the elusive 4-40 fasteners, I gave up and used two self-tapping screws instead.

Mounting the rear shocks and the servo saver was a very simple affair.

Mount the tie-rods for the steering next. I had no problem with this, except that I couldn't read the measurements for the tie-rod lengths. This isn't important though, because the lengths will vary from kit to kit.

Just get it close; there will be more time later to make fine adjustments.

Next mount the bumpers. For this step I chose to use Zap-Loc thread-locking compound on the fasteners to lessen the chances of them vibrating loose.

Mounting the tires to the rims required that I get my hands on some cyanoacrylate

(Continued on page 91)



Rear view of motor and shock installation.



One-piece chassis proved to be very strong.

Hopping Up Electric Cars

by DOUGLAS PRATT

ONCE YOU'VE gotten your first few cars to run properly, you'll be ready to look for ways to make them run faster, longer, and better. If you're racing, hopping up your cars will be important, but even if you just run your cars for fun, it's important to extract the best run possible out of them, and make them last as long as possible. Racers have developed a lot of techniques to make this possible.

Batteries

The first thing you should do is refer to my article "Charge" in the Winter 1986 issue of *Radio Control Car Action*, or Chapter 5 on batteries and charging in my new book *The Basics of Radio Control Cars* (available from Air Age for \$9.99). You need a clear understanding of what your batteries do and how they work. Armed with this knowledge you can get the best out of them. Without it, you can shorten their lives drastically.

The most important procedure to

follow is trickle-charging. You should always trickle-charge your packs overnight (16 hours is best) before putting in a day of fast-charging and discharging. This keeps the cells balanced.

The best charge of the day is likely to be that overnight charge. Even peak-detecting fast charges might not be as close to 100% of the pack's capacity as an overnight charge. This is due to heat buildup; a cell that warms faster than the other cells in the pack will build up internal resistance and cause the voltage to peak sooner than it would if the pack were cool.

For the important races, use packs that have been trickle-charged. Take 'em off the trickle-charger when you leave home and put 'em back on for half an hour or so before using them.

Temperature is a major factor in determining how nickel-cadmium bat-

teries accept, store, and release power. Generally, the cooler they are, the better they will accept a charge. I've known racers to bring all their battery packs in an ice chest. Keep your packs (and especially your charger) in the shade when you're using them. No point in letting in more heat than you have to. Keep in mind that most battery packs improve their charge retention after the first few charge/discharge cycles.

An accurate digital voltmeter is an essential piece of equipment. If your charger has a digital readout, so much the better; but you should have a voltmeter anyway. These can be bought at your local Radio Shack; Ace R/C also sells an excellent line of voltmeters at a very good price.

There is something to be said for deep-

discharging a battery pack before trickle-charging it. Ordinary running will bring a pack's charge down pretty low, but not completely flat. This is good for field work, since it makes it safer to fast-charge the pack. If a cell reaches the end of its charge before the other cells in the pack, the current from the other cells will reverse-charge it. Then it'll *really* heat up when you punch 4 or 5 amps of charge current through it; by the time the timer cuts off the charge, that cell could have overheated and vented. So you don't want to run the packs too flat during the day. That's why some chargers that discharge have an automatic cutoff.

On the other hand, when the day's running is through, the next charge your pack gets will be a trickle-charge. So you could drag the battery pack way down into a deep discharge and it wouldn't be damaged in charging. By "deep discharge" I mean a voltage of around 1 volt per cell; 6 volts for a six-cell pack. You can deep discharge a pack with a large resistor—BoLink* sells some for this purpose—or if your charger has a discharge circuit, use that. But in all cases, monitor the pack voltage with your digital voltmeter and remove the resistance when the pack voltage goes below 1 volt per cell.

Motors

Electric motors have to be broken in, just like gas motors. An electric motor has two brushes that carry the power to



The Kyosho auto charger will help you get the best out of your battery pack.

the commutator on the motor shaft. The commutator is round. The faces of the brushes are flat. That means that as the commutator spins, it will wear the brush faces into a concave curve. The deeper this curve, the more of the brush face surface touches the commutator and the more current is transferred. Also the better the brush/commutator fit, the less chance there is of sparking across this gap, which wastes power and deposits carbon on the commutator.

Many motors today come already broken in. They'll say so if they do. If you're not sure, remove the brushes and look. You may be able to look into the holes in the endbell and see the brushes.

My preferred technique for breaking in electric motors is to run them for about six hours. To do this, I lock the motor loosely in a padded vise. I bolt a small propeller to the front of the motor if it has cooling vents; the idea is to move a little air through it and dissipate the

heat. Then I connect it to a charger with adjustable charge current. I turn the current down low, and turn the timer until it starts sending power to the motor. Then I wedge the timer knob with a small block of balsa wood so it won't shut off. Finally, I slowly turn up the charge current until the motor is running away merrily. It should be run at roughly the same speed it'll attain at full power, or when plugged straight into a battery pack. I leave this setup running for six hours, checking it periodically to be certain that neither the motor nor the charger is getting too hot. This gives the brushes plenty of time to wear down to the commutator.

I don't recommend water-dipping motors. This is a procedure for running motors under water to soften brush material and carry worn particles away during break-in. Theoretically this hastens the break-in process. But don't do it. Even if you do it right, you'll probably fry a couple of them. The patient method of running motors for four to six hours has given me much better results.

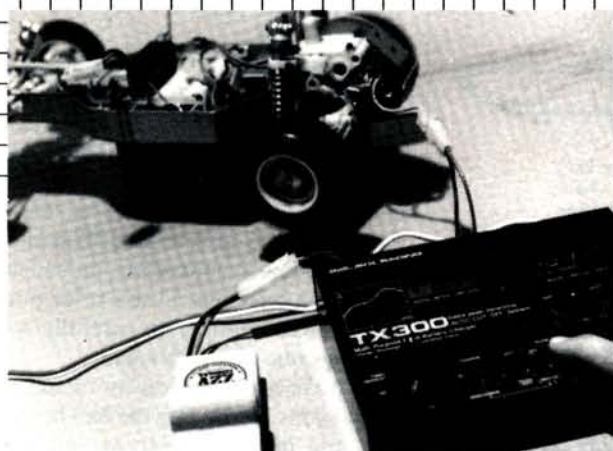
Measuring Current Draw

Your best measurement of how good a particular motor is is the amount of current it draws. This is measured in amps. Your faithful digital voltmeter can be set up to read amps very easily. Many super chargers also include a motor test circuit.

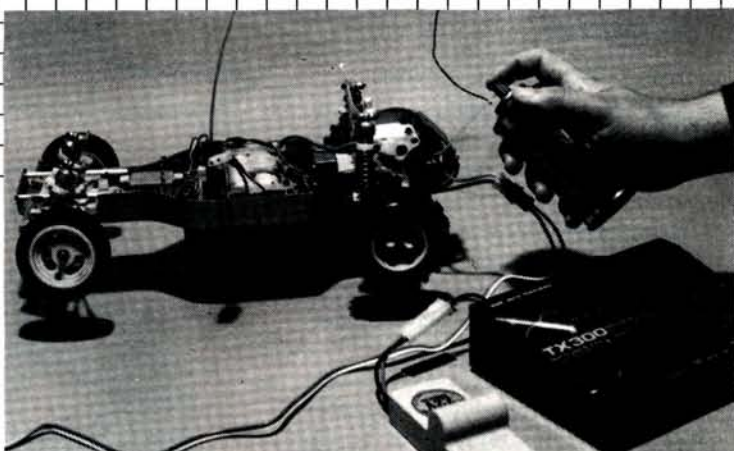
You can get good readings by measuring the motors either of two ways:



Kyosho LeMans electric racing motors. For best results, take the time to make sure your motor is well broken in.



Test the current draw of your motor. You should see a quick burst of power when the motor starts, then an amp or less of current as the motor spins.



If motor draws too much current, try a shot of motor treatment. Shut motor off, apply treatment, turn motor by hand a few times, and test again.

running free or under load. If you have a super charger, like the MRC* RB-450 or the AYK* TX300, you'll want to run the motor free. The TX300 has a meter that shows green, yellow, and red zones. If the motor reads in the green, it's okay. I prefer to get a reading of the motor's draw in amps; the RB-450 provides this through its digital readout.

A motor running free should show a draw of no more than 2 amps. A well-broken-in motor can show as little as 1 amp. If you're running your motor under load, as you would if it's installed in a car and connected to the drive train, make sure it's running at full speed. The current it draws will depend on how hard it's working to run the drive train. Hook up your tester, make your reading, adjust the transmission or tinker with the motor, take another reading, and compare. This should be done with a digital voltmeter, because a motor under load can pull as much as 20 amps. That much current can burn out the motor test

circuits in chargers, which are designed for free-running motors.

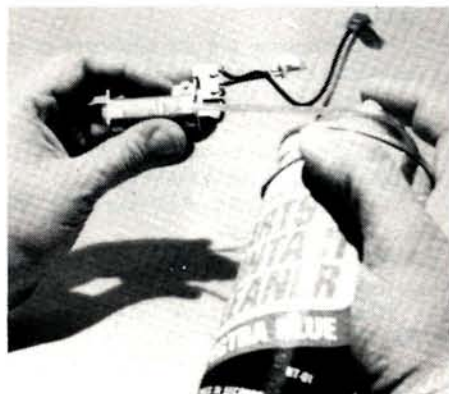
I have adapters to connect my battery packs to chargers with three-pin Deans plugs. These adapters make it easy for me to have a wiring harness that connects my digital voltmeter to the battery and charger. Well, the same adapters can be used to hook up your meter for reading amps. You'll need to make an adapter that has a female Deans plug on one end and a plug that fits your motor plug on the other end. The adapter that plugs into the voltmeter consists of a male and a female Deans plug, and two plugs that fit the meter (usually "banana" plugs). Connect the negative terminals of the Deans plugs with a straight length of wire. To the positive terminal of the male plug (goes to the motor), solder a short piece of wire with one banana plug on the other end. Do the same thing with the positive terminal of the other Deans plug. Now, when you plug this harness into the meter, you complete the circuit

between the motor and battery. If you happen to get a reading in negative amps, swap the banana plugs!

New Bodies

If you own one of the popular MRC-Tamiya cars, you probably built the beautifully-detailed plastic body that came with the kit. These are considerably more durable than, say, a typical static plastic model; but that doesn't mean that they won't get thoroughly beaten up. You might want to consider the purchase of an acetate shell body to fit your car and do most of your bash-around running with that.

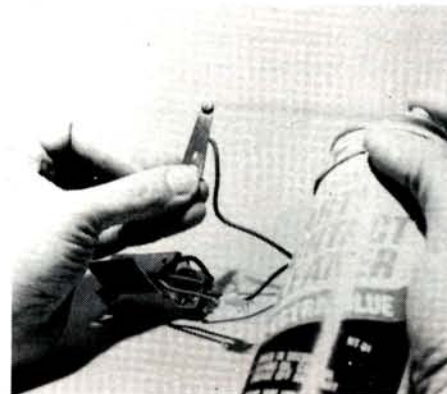
Clear acetate bodies are sold at most hobby shops. You can get them for almost all popular cars. Parma International*, BoLink, and Model Racing Products* are prolific body manufacturers. Bodies made by these companies can be trimmed to fit with scissors, and most will fit over the car's body posts. If there's a special body you want for a car,



The face of the speed control resistor can build up a layer of carbon and grit. A shot of contact cleaner solves the problem.



Motor treatment chemicals can be applied to the commutator to clean it.



To help prevent sparking, be sure of good contact. Use contact cleaner to clean face of wiper button.

like BoLink's classic Ford Vickie, you might have to get a set of different body posts. Parma and BoLink sell body post kits that will fit all popular car kits.

Motor Treatment Chemicals

Some companies are selling chemicals that claim to improve the running of your motor or lower its current draw. If they're used properly, these work just fine. Some of the motor treatments I've used with success include Associated's* Reedy in a Can, BoLink's Power Plus, and Gene Woods' High Tech Contact Cleaner.

The main purpose of these chemicals is to clean and improve contact between the brushes and the commutator. You'll see the best results from these if the motor is properly broken in, as described above. Each of these chemicals comes with complete instructions and tips for working over your motors.

Aftermarket Parts

Your dealer probably has a rack of replacement parts for the cars he sells. Some of these are to take care of you when you lose something; but most of them are improvements of some sort. There's a healthy aftermarket industry cranking out hot new goodies for every major car kit marketed. It's hard to keep up with all of them, but here are some of those available right now.

Generally speaking, any parts that beef up your car improve it. Stronger steering systems, thicker tie-rods, and stronger shock stays will all improve performance. And if something on your car breaks, you might as well replace it with a part that's stronger.

Add-on parts that'll show the fastest improvement in your car are ball bearings. These are available in sets for each particular car. They can be expensive, since they're precision made and very small, but boy, will they make your car go faster. Most electric cars only require four ball bearings, one on each wheel.



There's a healthy aftermarket industry in this country; above, CRP Frog/Brat Front Bumper.



The Parma 54-tooth Kimbrough Gear offered for cars that use the Parma-Associated differential.



CRP Frog/Brat Chassis Stiffener.



Parma graphite chassis for Associated RC10.



A wide assortment of add-on tires is available at your dealer. You'll want different tire compositions for racing on different surfaces.

The Associated RC10, a very fast car as it comes out of the box, needs a special set of ball bearings since each wheel runs in two bearings.

To install ball bearings, you're going to have to remove brass bushings set into various chassis parts. This takes some persistence. You should prepare a work surface that'll help keep you from damaging the parts. I use a piece of wood that has two 1/2-inch holes drilled into it. This gives me a soft surface on which to pound out bushings. I use a prick punch and a small hammer to carefully work bushings out of their sockets.

If you're building a car for racing, you should consider buying the ball bearings first, and installing them as you build! It'll save you trouble later on!

Tweaking the Chassis

"Tweaking" means adjusting a chassis so you get proper contact with the ground and accurate steering. It's a lot like having a wheel alignment done on your full-size car! And it's done for exactly the same purposes. Tweaking is most important for road racing machines, but paying attention to it can improve the performance of off-road machines too.

To start with, go back and look at the last few pages of the kit instructions. Most cars will tell you how the chassis should be set up, and how to adjust it. This is done by adjusting shocks, tightening and loosening chassis parts, or sometimes by shimming. I prefer a little toe-in to maintain good control in the turns. Whatever you use, make sure you make an identical adjustment on both front wheels!

Parma International and BoLink publish excellent tip sheets about how to set up and tweak their car kits. Ask your dealer to get you copies. They'll teach you a lot about whatever car you're running.

**The following are the addresses of the companies mentioned in this article:*

BoLink, 420 Hosea Rd., Lawrenceville, GA 30245.

Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.

AYK Racing USA, P.O. Box 3479, Mission Viejo, CA 92690.

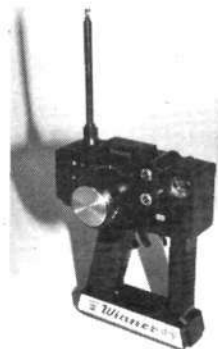
Parma International, 13927 Progress Parkway, North Royalton, OH 44133.

Model Racing Products, 18676 142nd Ave. NE, Woodinville, WA 98072.

Associated Electrics, 1928 E. Edinger, Santa Ana, CA 92705.

Custom Racing Products, Inc., P.O. Box 1485, Temple City, CA 91780.

What's New



THE WINNER SERIES of JR Pistol Grip two-channel radios is now available from Circus Hobbies (3132 S. Highland Dr., Las Vegas, NV 89109). Compact and lightweight, it's available in 27 MHz now and should soon be available in 75 MHz land frequencies. It features servo reversing, end point adjustment for both channels, continuously adjustable steering rate, adjustable steering wheel tension, and an easily removed crystal for frequency changes.



KYOSHO ASSAULT: The fastest growing trend in R/C cars is gas-powered buggy racing and the Kyosho Assault has been designed to lead the way in this new adventure. The 1/10-scale kit comes complete with an O.S. CZ-1 .12 cid engine, a built-in glowplug starting system, and all hardware. You supply fuel, a two-channel radio, and a D-size alkaline battery for the glowplug starter. The Assault is a super performer on any terrain thanks to four-wheel independent suspension and four oil-filled shocks. It's lightweight, but very tough—the chassis and suspension system are made of rugged aluminum. Best of all, the Assault is fast, but easy to assemble, operate, and maintain—the perfect beginner buggy. The Kyosho Assault is distributed to leading retailers by Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).



2PKA/MAGNUM JUNIOR: Futaba's (555 W. Victoria, Compton, CA 90220) new two-channel system is built around a pistol-grip transmitter which features full range steering Dual Rate, servo reverse, and throttle ATV (end point adjustment). Three different 2PKA systems are available with either 2-S28 servos, 2-S29 heavy-duty watertight servos, or 2-S32H high-speed servos. Completing this car, boat, or off-road system is the R2GS receiver which operates with 2-S28 or 2-S29 servos or with R4H micro receiver and 2-S32H servos, switch harness and dry cell battery case; 27, 72, and 75 MHz.



HOT NEWS FROM MRP: MRP (18676 142nd Ave., N.E., Woodinville, WA 98072) has two new bodies to add to their line of 1/10-scale off-road replacement bodies. The Sandhawk 10 is styled to fit the RC10 and MRP's new two-wheel-drive PRO-110. The Raceco SS body has been restyled to fit the RC10. The long, lean wedge body not only looks great but works well on the car. Both bodies will fit on most popular 1/10-scale cars.

NEW PRODUCTS FROM BOLINK R/C CARS



(BL-2378) The 1/10-scale Funco SS-2A Desert Racer is especially for the Associated RC10 and fits exactly like the original. Also mounts on most other 1/10-scale cars. These and other products are available from BoLink R/C Cars (420 Hosea Rd., Lawrenceville, GA 30245-4695).



(BL-2403) The perfect mate for our E-Z Mounts or any other body mount, these hood clips are small and strong with the loop bent so you can get them off quickly.



(BL-1860) Tired of getting your adjustment knobs bumped on your Magnum transmitter? BoLink's transmitter cover can be cut out to cover all adjustments from accidental hits and can remain on during use.



(BL-5113) Have you ever pulled your RC10 off the track and found the tub full of dirt? Made from lightweight strong plastic, this tub cover can be taped or "Velcroed" directly to the tub.



21CX GM BUGGY ENGINE:

Altech Marketing (P.O. Box 286, Fords, NJ 08817) and Enya Model Engines are proud to introduce the Enya 21CX GM Buggy engine for 1/8-scale gas buggies, which desperately need the power of a .21 Schnuerle engine. With 0.8 hp and an rpm range of 3,000 to 27,000, the 21CX GM is bound to be a real mover! This engine comes with a die-cast heat-sink head; an AAC (aluminum piston, aluminum cylinder, chrome liner) setup for maximum power output, and a one-piece crankcase for toughness.



POWER-PAK BATTERIES: Power-Pak (6216 Oakton St., Morton Grove, IL 60053) makes batteries for worry-free racing and winning. All batteries are matched within each assembly to assure uniform discharge rates and performance characteristics. Power-Pak offers six different types of popular car packs that all have quick charge capabilities.



PRO-TECH AC/DC CHARGER: Designed to be the best, the Pro-Tech AC/DC charger from Model Craft Manufacturing (3455 W. 6th St., Los Angeles, CA 90020) features two DC cords—cigarette lighter plug and alligator clips, automatic trickle-charge circuit, and a discharge circuit for equalizing nickel-cadmium cells. Available in three types: AC/DC input, current adjust (4 to 8 cell); AC/DC input, 6 cell (7.2v) and 7 cell (8.4v); and DC 12v input, 6 cell (7.2v) and 7 cell (8.4v).

(Continued on page 80)

H.S. SILVER FOX

(Continued from page 28)

throttle properly balanced against steering, you can do the slickest four-wheel drifts ever. Under "pedal-to-the-metal" acceleration, the four-wheel drive allows each tire to generate a sizable rooster tail of dirt.

The real fun came when I took it out after an unseasonable winter rain which had quite effectively turned the local ball field into something akin to the Everglades. The Silver Fox could have just as easily been called "Swamp Fox"—it loved it! While negotiating the field at better than moderate speeds, I encountered (before I saw) a rather severe bump in the terrain. In a flash the Silver Fox was airborne and began a rolling twist which looked just like something out of the television show *The A-Team*. It crashed down on its roll cage and tumbled over, engine shrieking wildly, tires throwing mud everywhere and digging a mini-trench as it skidded along on its side. I finally shut the engine down and walked over to it, expecting the worst and mentally preparing a spare parts order for Hobby Shack. Nothing! Everything was fine except that there

was lots of mud all over everything and chipped paint on the roll cage where it must have encountered a rock or something. I think you could heave this thing off the World Trade Center and it would still survive!

I took it home, sprayed it with a garden hose, checked all the linkages and hardware for tightness, and the radio for operation. I re-lubed the chain and other moving parts and I was back in business.

This exercise disclosed the only thing which I considered annoying about the car: to remove the radio box cover requires removal of the body, which is nearly impossible without first removing the roll cage. Still with me? To remove the roll cage unfortunately requires the removal of two machine screws, the nuts for which are made inaccessible by the forward mount of the rear shocks—all this for a plastic body. I recommend running the Fox without it. That's a long way of saying that the major "problem" was no big deal.

Gas-powered cars, especially those the size of the Silver Fox, are somewhat more complicated than most electrics, but this is primarily in the area of operation. They do require the starting equipment I mentioned, where the elec-

trics require only a battery charger. However, from an endurance standpoint, they'll run just as long as you keep fuel in the tank. Maintenance is about the same in either case. The big difference is size and raw "stump-pulling" power which is, as yet, unmatched by the electrics. There's also the unmistakable sound of the engine with its scale-like exhaust smoke. Hey, if electrics were the only answer, Ford and GM would be building golf carts and Standard Oil would be owned by the Duracell people.

Latch on to one of these "killer kars." The Fox will always outrun the hounds!

**The following are the addresses of the companies mentioned in this article:*

Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92728.

Futaba Corporation of America, 555 W. Victoria St., Compton, CA 90220.

Satellite City, P.O. Box 836, Simi, CA 93062. ■

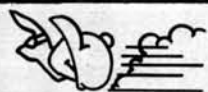
MRC FOX

(Continued from page 45)

complete that no trial and erroring is needed. All the necessary information is provided to make radio installation a 15-minute job.

The front suspension is a double wish-

(Continued on page 79)



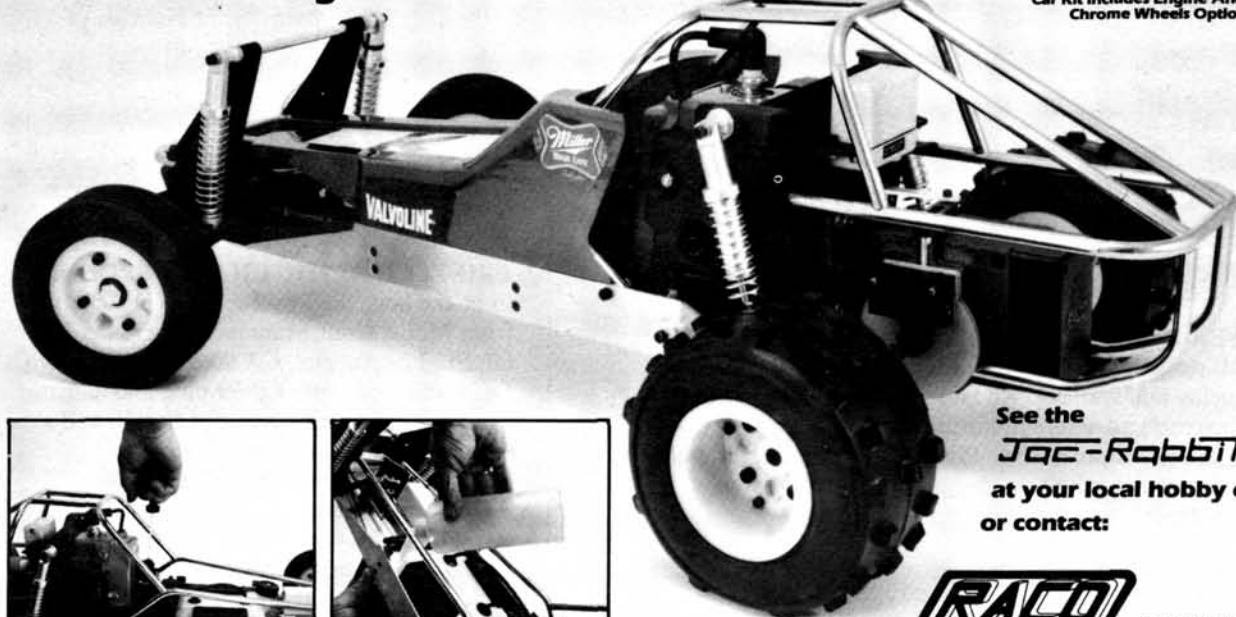
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ASSOCIATED RC500

(continued from page 55)

Now complete steps 65 through 86. For step 87 remember that these shocks are not the same shocks pictured. Steps 89 and 90 are the clutch assembly. Take great care when tapping the two dowel pins into the flywheel, because the pins are made of very strong but brittle metal and could break.

Once these steps are complete, it's time to attach the flywheel to the engine. I chose to go with the K&B* .21 car engine. It has a very large head for excellent heat dissipation and is just plain potent. When ordering a K&B, keep in mind that they don't come with carburetors, because so many racers are very picky about what kind of carb they want on their engine, so K&B leaves the option open to you. I found that, with the use of an OPS carb, you'll also need a carb spacer to clear the belt assembly. This is available from Associated.

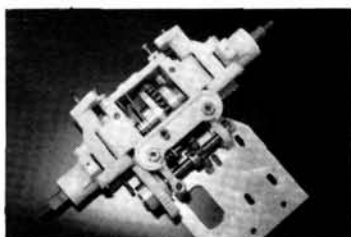
Before attaching the flywheel on the K&B, place a washer on the crankshaft behind the tapered sleeve to ensure proper alignment of the two gears.

The rest of the construction is a fairly easy and uneventful affair. The only

thing I recommend here is to point the exhaust outlet up through the body instead of down at the ground. If it's pointed down, not only does it make a mess of the inside of your car, but it could get oil on the surface of the tire and the track, causing loss of traction.



Left: Futaba Magnum radio provided precise control. Below: Rear end showing chain drive; kit now comes with belt drive and conversion kits are available.



On pages 7, 8, and 9 of the manual are some very helpful tips on choosing the right body; the use of wings, motors, and carbs; the setup of the carb and brake linkage; steering linkage; and differential adjustment.

PERFORMANCE. There is no way for me to measure the performance of this car without the use of expensive timing equipment and proper facilities, but I really don't need them. The list of first-place wins compiled by this car and its talented drivers is proof enough that this is the fastest, best handling car in the world.

The only thing I regret is that, due to time limitations, I wasn't able to cover all the options available even on the stock version. For the next few weeks I'm going to gather as much info as possible on go-fast tricks and goodies, as well as some good solid racing advice in an effort to make winning races in stock or modified classes more tangible for the newcomer, and I'll present this information in Part II of this article in the Summer 1986 issue of *R/C Car Action*.

Steve Pond, c/o *R/C Car Action*, 632 Danbury Rd., Wilton, CT 06897.

*The following are the addresses of the companies mentioned in this article:

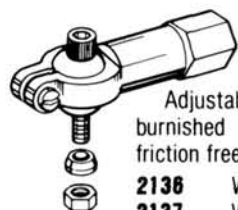
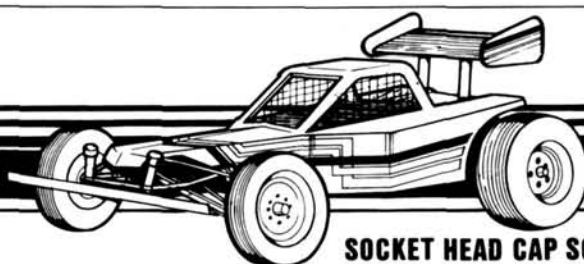
Associated Electrics, 1928 E. Edinger, Santa Ana, CA 92705.

Pacer Technology & Resources, 1600 Dell Ave., Campbell, CA 95008.

K&B Manufacturing, 12152 Woodruff Ave., Downey, CA 90241. ■

DU-BRO

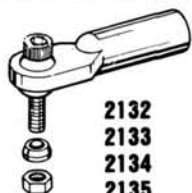
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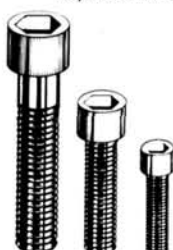
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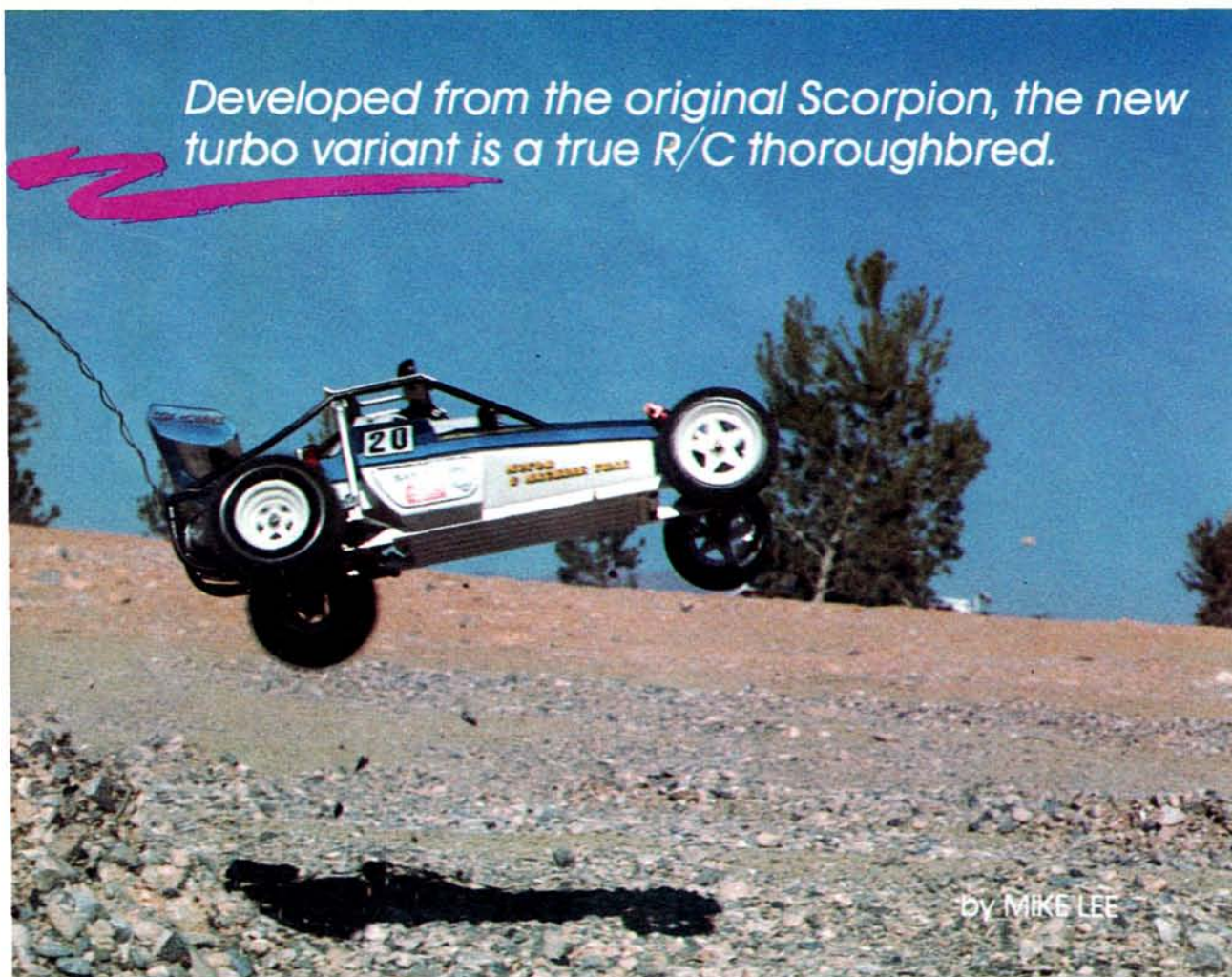
Track Report



Cox Hobbies

Turbo Scorpion

Developed from the original Scorpion, the new turbo variant is a true R/C thoroughbred.



photos by Mike Lee

by MIKE LEE

SO OFTEN been said that competition breeds thoroughbreds. No one has this saying more true than in car racing. It's not just steady and skillful driving that makes a car a winner, but when the driving is on the drivers is on the cars themselves. In the end, the cars will be the

This Road & Bench Review deals with a fine example of thoroughbred development from a vehicle that has become a legend in its own time, the Cox Hobbies* Turbo Scorpion. The Turbo Scorpion is a direct descendent of the famous Scorpion that was the scourge of the West. At one time, you could go to any West Coast track and find a stampede of Scorpions in the

pits ready to duel. And if you didn't have one, most drivers would tell you that you had already lost the race!

THE KIT. Because the Turbo Scorpion is a refinement of the breed, let's see just what has been improved to make it a new contender. The body has a new design, with sleeker lines and more pleasing contours—but looks aren't everything. Under the hood is

a differential-equipped transmission for better power transfer to the wheels. The suspension has been improved with over-size oil dampeners and the front end sports new trailing arms with adjustable camber levers. The gearing has been updated for higher speeds, and the speed controller is now a full three-speed forward with reverse unit. Even the tires have been



changed to assist in the maximum traction effect on dirt. The Turbo Scorpion seems ready to take on some serious competition right out of the box.

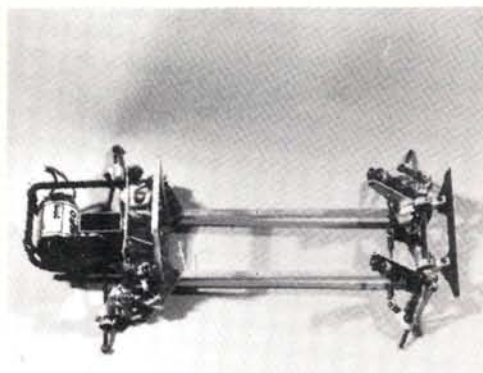
The Turbo Scorpion is designed to meet the qualifications of several ROAR- and ORCCA-sanctioned classes, most common of which are

the Production, Stock two-wheel-drive and Modified two-wheel-drive. The car is set-up to handle any standard 05 class motor and a six-cell battery pack. With modifications to the basic car, a seven-cell pack will fit. The Scorpion will accept almost any two-channel radio system using medium- to small-size servos,

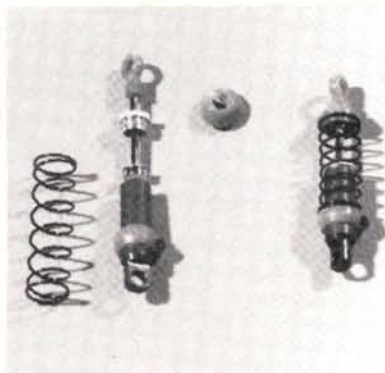
and there is room for a 500-mAh battery for the radio.

The Turbo Scorpion is 15.75 inches long and 8.85 inches wide. The wheel-base is 10.25 inches with a ground clearance at rest of 1.18 inches.

(Continued on page 95)



Chassis with rear cage and front suspension towers. Car is halfway complete and looking good.



A look at the over-size oil-filled dampeners with coil-overs as supplied. Very effective dampening achieved, an improvement over the previous Scorpion.



Front-end view of Turbo Scorpion. Clean lines and adjustable front-end geometry are effective

MRC FOX

(Continued from page 74)

bone type utilizing a single spring coil-over/oil dampener unit connected to both of the lower front suspension arms. The dampener is fully adjustable. Three differently baffled pistons are provided, allowing a choice of shock characteristics. Spring spacers are also provided to stiffen the suspension. The steering tie-rods attach directly to the servo through a servo saver. No bellcranks are used, ensuring a minimum of play in the steering setup. Several different servo saver wheels are provided to fit most of the major brand servos. One nice feature of the Fox is that a reverse servo isn't required for steering. That's nice if your radio doesn't have reversing switches, since most radios come with only normal rotation servos.

The front tires are a straight-ribbed, low-profile semi-pneumatic type. They spin very freely on metal axles with plastic bushings. Ball bearings are available as an option.

The gearbox housing not only encloses the drive system but it also forms the center structure of the rear suspension. The differential and drive gears are made of reinforced nylon. Eight ball bearings are used to support the flexible rear drive shafts and the drive gears. The rear flexible drive shafts came pre-assembled and incorporate rubber dust boots to protect the joints. The motor provided in the kit is the industry standard RS-540S.

Other motors are available from Tamiya. Two pinion gears (15- and 18-tooth) are provided.

The rear suspension is also a wishbone configuration. However, it utilizes a coil-over dampener on each wheel. The dampener mounting tower is made of fiberglass for stiffness. The rear tires are a low-profile, oval block tread design.

The battery used for this review was a Tamiya racing pack. This is a 6-cell, 7.2-volt pack which is wired in two, 3-cell rows. This car will also accept a 6-cell "hump" pack. The battery pack is easily changed through a hinged door/support from the bottom of the car.

The charger I used was the MRC Quick Charger RB-465. It's a timer-regulated quick charger which can be operated from a 12-volt battery or a 110-volt house current. It charges only 7.2-volt 6-cell batteries. Charge time is 15 minutes. The charger also incorporates a discharge circuit to ensure safe charging of an unknown pack and to determine the capacity of a battery. The RB-465 can also serve as a trickle charger to maintain batteries at peak charge until they are needed. I found this charger easy to use and its dual voltage capacity was much appreciated.

The Fox goes together so easily that the basic construction took less than 6 hours from the time the box was opened until it was running in the street.

All that remained was to cut out the polycarbonate body, paint it, and add the decals. I used Tamiya's paint specially

formulated for polycarbonate resin. It adheres well, comes in many different colors, and when wet cleans up with soap and water. When it dries, the paint becomes waterproof, but it stays flexible enough so that it doesn't crack when the car gets bounced around. Tamiya provides a very nice set of pressure-sensitive decals to add the finishing touches to the Fox.

PERFORMANCE. Now I come to the most important part of the review: how does the Fox run? Well to make it short, the Fox lives up to Tamiya's claim. It may very well be the fastest totally stock car on the market, and with the addition of optional ball bearings and a modified motor, the Fox will be a real terror on the track. It handles well on smooth ground, and holds a very straight line over rough terrain. Its suspension absorbs 1-foot jumps without a wimper and it has a very low CG, so the inner wheels stay planted on the ground even on very high-speed cornering. The Fox may be the best-handling buggy I've ever driven. It goes where you point it and it goes there fast.

The Fox is an excellent kit which builds into a great buggy. So get one; you won't be disappointed.

*The following are the addresses of the companies mentioned in this article:

Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.

Altech Marketing, P.O. Box 286, Fords, NJ 08863. ■

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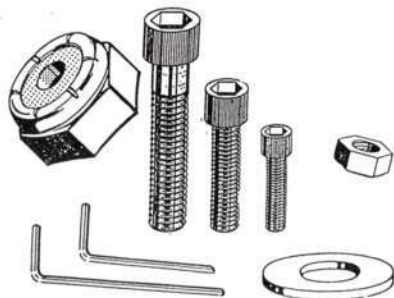
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MEMBER RCM

What's New



TRI STAR IMPORTS (P.O. Box 11392, 3161 Coffey Lane, Santa Rosa, CA 95401) has been appointed the exclusive importer and distributor throughout the U.S. for Nichimo R/C Cars. Nichimo Plastic Company of Japan has been a respected model maker for 50 years. The first kits will be the Spirit FF, a 1/10-scale off-road racer with front-wheel drive. The kit includes an RS-540 motor, a six-volt receiver tap, four-wheel independent suspension, three oil-filled adjustable shocks, a sealed gear box with differential, and much more.



NEW DU-BRO HARDWARE AND ACCESSORIES: Du-Bro Products (480 Bonner Rd., Wauconda, IL 60084) announces their new line of hardware and accessories for the R/C car modeler. The first to be released is a line of metric screws, nuts, and washers, including nylon insert lock nuts, hex nuts, flat washers, socket-head cap screws, and metric hex wrenches. See your local dealer for these new products by Du-Bro.



CIRCUS HOBBIES ASHURA, TOMCAT, AND ZERDA: Circus Hobbies (3132 S. Highland Dr., Las Vegas, NV 89109) announces three new electric racers. The Ashura is a 1/12-scale, four-wheel-drive on-road leader. It comes completely assembled out of the box except for a two-channel radio and 7.2-volt nickel-cadmium battery. The Tomcat



is the new terror for off-road competition. It requires only radio and battery installation be track ready. The pre-assembled Zerda is an out-of-the-box-ready four-wheel-drive charger. After extensive off-road track testing, this car has shown that it can win against the most formidable racing setups. All it needs are the battery and radio.



ROYAL .21 ABC CAR ENGINE from Royal Products (790 W. Tennessee Ave., Denver, CO 80223) features over-size cooling fins on head, twin ball bearings, ABC Schnuerle porting, and a massive one-piece crankshaft. Contact Royal for more info.

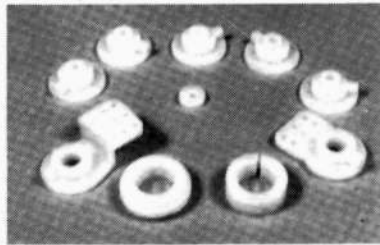


THE WILD ONE: MRC-Tamiya (2500 Woodbridge Ave., Edison, NJ 08817) has a finely-tuned machine with a perfectly matched power source all in one package. It's the Wild One! Tamiya's Wild One will do things on and off the track that will give you new driving pleasure. The Tamiya 7.2-volt rechargeable nickel-cadmium battery provides more current instantaneously than most other batteries for faster acceleration, more power, and higher speed.

NEW PRODUCTS FROM PARMA



One of Parma's many "hop-up" parts for the Monogram Lightning is the Rear Mono-Shock Kit. It replaces the stock rear spring setup with an oil-filled shock.



Protect your servo from damage during a collision with Parma's Universal Servo Saver. It will fit *all* servos used in R/C cars.



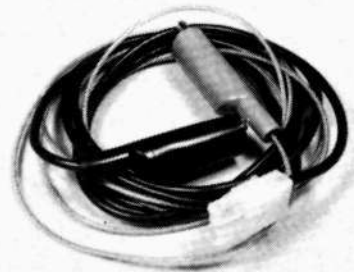
The Parma Body Mount Kit for the Frog enables you to mount sedan-type bodies to the Frog. For a professional looking installation, try them out!



The Parma Hot Shot Front Suspension Arm Bracket is designed to take the "slop" out of your front suspension arms and make them much stronger.



The five-cell 4,000-mAh battery pack for the Tamiya Bruiser is the only replacement pack available for this 1/10-scale 4x4 truck. This pack is made to fit and requires no modifications. These and other products are available from Parma International (13927 C Progress Parkway, N. Royalton, OH 44133).



Parma now has an assembled charge cord with a Tamiya plug for five-cell, 1,200-mAh or 4,000-mAh batteries. This charge cord is for use with the Bruiser battery pack as well as other five-cell packs.



THE GRIZZLY is a full-blooded race car with awesome size, power, and durability. Measuring 38 inches long, 21½ inches wide, and 12½ inches high, it has plenty of ground clearance. The Grizzly is powered by a 2-plus hp gasoline engine and easily runs 40-60 mph. It features high-strength aluminum chassis, suspension parts, and wheels as standard equipment. The kit includes engine, just install your two-channel radio, fill 'er up, and experience the Grizzly. Available from Pacesetter Products (Garner Valley, Box 257, Mountain Center, CA 92361).



PRE-WIRED NiCd PACKS FROM ROYAL:

These top-of-the-line 7.2-volt, 1,200-mAh pre-wired nickel-cadmium packs from Royal Products (790 W. Tennessee Ave., Denver, CO 80223) come with standard male and female connectors used in most electric cars and can be fast or slow charged. They are available in flat, camel-back style, or twin camel 8.4-volt hot pack.

What's New



ROYAL RIPPER: It's ripping the competition in price and performance—it's the Royal Ripper from Royal Products (790 W. Tennessee Ave., Denver, CO 80223). This 1/10-scale, high-performance four-wheel-drive/steering off-road racer incorporates shaft drive and twin differentials, assuring maximum distribution of power to all wheels. With a length of 16¾ inches, a width of 9½ inches, and a height of 5¾ inches, the Ripper weighs 3 pounds, 11 ounces. The Mabuchi RS-540S motor assures high performance but motor mounts will accept most of the custom style racing motors for added performance.

MRC-TAMIYA FOX: Built right out of the box, with no modifications at all, MRC-Tamiya's (2500



Woodbridge Ave., Edison, NJ 08817) Fox bolted from the starting line as timers recorded the action—80 feet in 3.5 blazing seconds. Incorporating such advances as Battery Eliminator Circuitry (BEC), competition suspension, a top fiberglass shock tower, lightweight race engineered chassis and wheels, it combines the necessary off-road racing speed handling, and performance to put you in the winner's circle. Lap times never before possible are now achieved by the Fox.

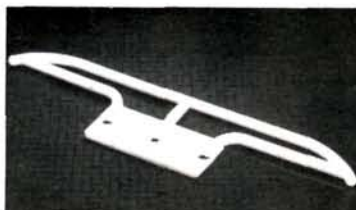


AUTOGRAPHICS: Autographics of California (8536 Kern Canyon Rd./169, Bakersfield, CA 93306) has a variety of decals from the biggest sponsors in full-size auto racing. Each sheet of their Designer Series contains enough various sizes of logos to duplicate the full-size race car or design a special custom layout. Autographics also has Sign Kits which can be used to personalize your car with a letter style used by actual sign painters on full-size cars. They also have stylish black numbers with matching white backgrounds for 1/12, 1/10, and 1/8 scales.

NEW PRODUCTS FROM PRO LINE:



(086) These side Nerf bars come with complete mounting instructions and can be colored with dyes used for fabric. Fits RC10 and others. These and other products are available from Pro Line (P.O. Box 456, Beaumont, CA 92223).



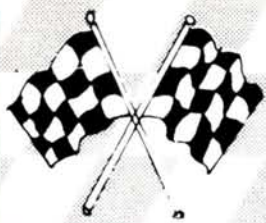
(076) Now made with a longer-lasting, more durable material, this nylon bumper can be colored with dyes used for fabric. Fits the RC10, Cox (Kyosho), Scorpion, Beetle, and Tomahawk.



(117-R) This 1½-inch diameter tire has an octopus-like tentacle tread design that clings to slick surfaces and carpets like no other tire. It fits the Hornet, Frog, RC10, Yokomo, Super Champ, and Monogram Lightning, and is part of Pro Line's new Challenger series.



(016-F) When high traction is a necessity, this tire has the perfect tread. It grips the surface and is great for cornering. Part of Pro Line's new Challenger series, this tire fits the RC10, (Kyosho) Cox, and AYK.



The start of the race can get pretty hairy and the carnage continued for quite a while in the hard-fought races.

by MIKE LEE

Las Vegas Speed

RACING FOR everyone! That was the idea for the first annual R/C Speed Week race in Las Vegas, Nevada. Held during the week before Christmas, this race featured R/C

car competition in $\frac{1}{8}$ gas road racing, $\frac{1}{10}$ electric off-road, and $\frac{1}{12}$ electric road racing.

The race was sponsored by the prestigious Frontier Hotel/Casino, a main

sponsor of such full-scale events as the famous Frontier 500 off-road race. The contest director, Lou Peralta of California, is a race fan of both full-scale and radio control. Lou's concept was to bring together for the first time race drivers of all classes to a single race, not only to compete in top-notch racing, but to share ideas in a week-long mass dis-



Lineup for the start of $\frac{1}{12}$ electric A Main. Eventual winner was Jim Rose.



Dan Stokes proudly displays Iron Man Trophy he earned for racing efforts in four separate car classes.



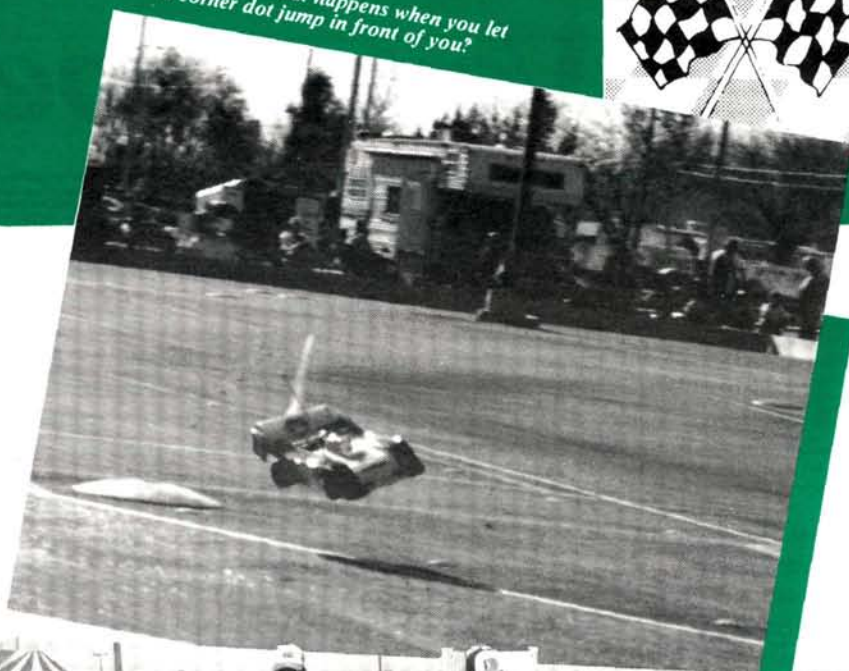
Week

cussion of tech talk, mechanical shop talk, and, of course, bull-shooting sessions.

Racing on the new Frontier track proved to be an experience. The track was laid out in the rear parking lot of the Frontier, with the road race course laid within 30 feet of the off-road course. This provided the race crew with centrally-located operations, as well as keeping time for track changes down to a minimum. While I'm speaking of the track, I'll take you through a driver's tour of the tracks from the car. For the road racing drivers in $\frac{1}{8}$ gas, the track proved to be a nice one for speed.

Taking off from the starting gate, you accelerate hard for about 25 feet and enter turn one, a sharp and narrow dogleg turn around a light pole with a concrete footing. Needless to say, hitting this is less than healthy for the car. You accelerate gently, swinging right to turn two and get on the gas coming out. Let the car swing wide in a constant arc toward turn three, hitting the gas shortly as you enter the turn. You hit the brakes hard and set up for the wide dogleg of turn four. Drift through gently, making

Ouch! See what happens when you let a corner dot jump in front of you?



Final lineup for start of $\frac{1}{8}$ two-wheel-drive. Note the staggered abreast start.

sure you don't clip the dot, unless you want to eat the wall. Once clear of the dot, give the car all she's got down about 150 feet of straightaway. Watch your line about 100 feet down because there's a slight dip that can give you air if you're not careful. Back down the throttle a bit and take the wide number five turn, punching all the way through toward six. Ease down again and punch out of six to seven and start grabbing the brakes. You've just come around the second light pole with a big island around it and now you get to dogleg around it. Hit the gas slightly and brake hard for a tight hairpin at turn eight. After turn eight, punch hard and stay wide as turn nine comes up, and then clip in close. Hold a close line to the final turn at ten and then open her up as you pass through the lap-counting gate.

Like I said, the track is pretty fast, and for the $\frac{1}{12}$ cars, it was like 95% full punch

and brake once a lap. This is the kind of track that makes drivers and mechanics go looking for all the speed they can find. The track itself was enclosed by the standard plywood barriers and traction was provided by a generous application of sugar water. Traction was great, and in some cases, almost too much!

Qualifying started on Wednesday, December 18, after two days of practice. Every day saw at least two rounds of qualifying, and drivers needed to qualify in only one round to make a main event.

The main events began on the 19th. There was no doubt the $\frac{1}{12}$ cars were fast, this class being officially called the $\frac{1}{12}$ Modified. In the B Main, six cars went at it for 8 minutes, two falling out of the competition early on. The winner was Phillip Schmidt by two laps over Tom Messer and Cleon Whiteley. Phillip bumped up into the A Main.

In the A Main, ten cars lined up for the 8-minute slug fest, with most of the cars

Las Vegas Speed Week

pretty well matched up. It was noteworthy here that most of the cars used light suspension frames rather than the more sophisticated full-suspensioned cars. The racing was pretty heavy with Jim Rose, Loren Sachs, and Henry Foulk battling it out most of the way. Rose got the better of the other two and at the end of 8 minutes came out ahead with Foulk in second and Sachs only 3 seconds behind.

Next up were the big guys in two-wheel-drive $\frac{1}{8}$ gas. These cars really fly. The C Main was taken by Jim Crates with 52 laps in 20 minutes. Bob Sullivan was 2 laps down and was followed by Albert Pfaff. Crates was given the bump up to the B Main. It was in the B Main that the cars really flew. In this 25-minute main, the cars battled hard from the very start. The racing continued hot and heavy with Al Vegas getting the green flag to the A Main.

The A Main lasted 30 minutes. Nine cars lined up for the field in a staggered abreast line. The horn sounded and all nine cars roared into turn one. Amazingly, all nine made it through the turn without a crash, some cars three abreast. Ron Paris jumped out front and held the lead for about the first 7 minutes. Butch Kloeber and Howard Robertson stayed hot on his tail, with Kloeber taking the lead several times. Paris stayed out front for the most part and took the checkered flag with 104 laps in a time of 30:07.5. Robertson finished in second with 101 laps, and third was taken by Gus Gustafson with 97 laps. Paris used one of his own superbly prepared engines to power the car and there was no doubt it was one of the most powerful cars all weekend.

The four-wheel-drive gas cars came up next and the B Main was something to watch. Three cars started the race, with Heinz Meyer taking the lead easily—at first. Heinz suddenly developed transmission problems. Jim Rose also got gremlins and dropped out. That left only Gary Ele on the track, and he was still feeling it out. Twelve laps later, Meyer jumped back in and started clipping away at Ele's lead. Meyer got within two laps of Ele, and suffered more problems.

Another eight laps later, Meyer got back in and proceeded to seal it up for the win. Meyer went to the A Main with Ele trailing some seven laps back.

In the A Main, ten drivers started out, only this time the cars went around a bit faster than their two-wheel-drive counterparts. The four-wheel-drives really stick to the track, and with the superb traction already there, these cars took full advantage of their power. The cars could literally hit full-throttle all the way down the straight and through turn five.

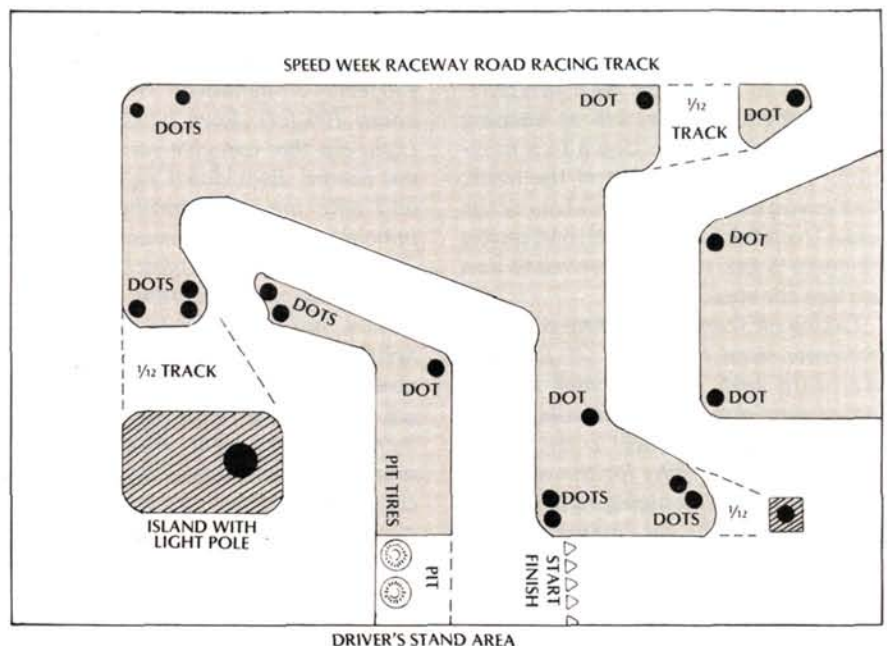
Paul Dionne showed the way for the majority of the race, but was closely followed by Dana Smeltzer and Ron Paris. Only one car failed to finish, and attrition took care of at least four others. Eventually there were only three cars in serious contention.

Paul Dionne and crew won both the pit war and the race. Paul finished with 114 laps in a time of 30:04.3. Dana Smeltzer was second and Ron Paris was third. There was some great racing from the asphalt drivers.

Next the scene switched to dirt. Let me drive you through the dirt course now. The off-road course is a narrow and very

rough course with lots of sand and very tight turns.

Starting from the short straight with the moguls, punch hard but careful through here to turn one, which is a tight-and-narrow dogleg with a slight bank. Punch wide open under the lap-counting bridge and take turn two, a slight right turn that is flat. Be careful here because the first of several small jumps is right after the turn. After making the jump, take another gentle right and stay on the power to the whoop-de-do's. These are really not too bad if you have good speed because you can clear all three humps in one hop. Stay on it and cut to the inside of a left banked turn. This is the widest of any turn, but one of the slowest because of the deep sand. Once clear of the sands, give it all you've got to make the tabletop jump. The jump is pretty wide and the car won't get much air even wide open, but if you lack power, you might be better off to bypass the jump as it's a bit high. Once clear of the jump, back off and hang a tight left turn. Here again you'll find lots of sand, combined with an unforgiving wood barrier to the inside of



Right: Some happy winners at the awards ceremony.

Below: The top three guns in 1/12 modified; from left, Sachs, Rose, and Foulk.



Above: Winners in 1/8 gas two-wheel-drive class; from left, Gustafson, Paris, and Robertson. Left: Victors in 1/8 gas four-wheel-drive; from left, Dionne, Paris, and Smeltzer.

the turn. That bugger could high-side your car if you cut the corner. Out of the hairpin, you immediately go right and punch through to turn seven. Nothing here except more sand; just enough to get you a bit squirrely. Turn eight has a neat little point jump sticking halfway from the outside of the turn. This keeps you aiming for the inside and prevents anything but the best drivers from making a pass here. After making this one, hit hard left and swing wide to the outside with full power and take the bounces through the moguls and back to the lap-counting bridge.

There is no doubt that this course

requires punch and driving skill. The first group of drivers found this out real fast, starting with the B Main for Stock class two-wheel drive. Four drivers took to the track, with one driver dropping out early, a victim of the rough track conditions. Paul Williams managed to jump out of the pack and before the end of the 4-minute race he lapped everyone and got himself a bump up to the A Main event. William Wishon captured second with Jim Wang in third.

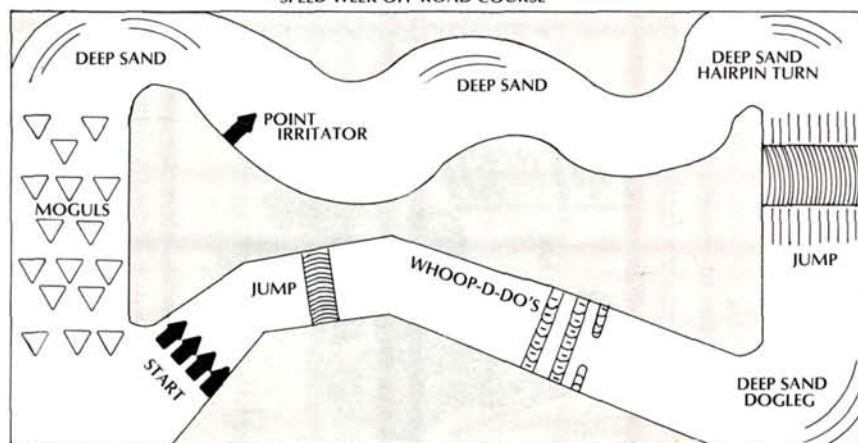
In the A Main eight cars were crammed on the track in rows of three abreast, according to their qualifying times. Paul Williams again took the lead early on and had to play hard to stay there. Chris Bartolone was hard on his heels almost all the way through the race. At the end of 4 hard-fought minutes, Williams put his car into the winner's circle only 10 seconds ahead of Bartolone, Don Pinero was a lap down in third place.

The Modified two-wheel-drive group came to the line next, and the overwhelming choice of car was the Associated RC10. Gene Husting of Associated Electrics was last seen smiling from ear to ear after noticing the familiar gold anodized chassis adorning the track.

Beginning with the C Main, six drivers took the starting flag and the field was dominated by 9-year-old Robert Woods. He took the lead early on and never looked back. His time was 13 laps in 4:13. In second place was Loren Sachs, who had just finished a couple of duels in the road racing wars. Loren finished with 12 laps in 4:09. Joe Michael Jr. was third with a super close 12 laps in 4:09.9. That's what electronic computer scoring can do for you!

(Continued on page 98)

SPEED WEEK OFF-ROAD COURSE



DRIVERS STAND AREA

AIRTRONICS XL2P

(Continued from page 10)

ments be made with the mechanical linkages. Once the optimum settings are achieved, fine tuning can be achieved with the dual-rate knob.

The steering trim adjustment knob is to the right of the steering dual-rate adjustment control. Its function is to make any small adjustments required to insure the car runs on a straight course. The steering trim has about a $\pm 15^\circ$ trim, but you should really make any known mechanical linkage changes so that this directional trim control can make steering changes for you around neutral.

Below the upper control positions to the left is the trimmer panel. The plastic cover must be popped off to obtain access to the trimmer panel adjustments. First is the "back" control adjustment, on top. The function of this control is to give a degree of braking as a function of the trigger position. The trimmer position gives the degree of braking provided and is controlled by a switch located just above the hand grip position on the assembly connecting the front and rear of the transmitter. The switch can be actuated momentarily by thumb action to obtain a "pulsed" braking action by electrically applying a reverse voltage to the drive motor. In my tests of the Airtronics XL2P in a Tamiya Porsche 956, I've found this feature most effective in cornering. You just blip the back switch to brake and of course the amount of braking is proportional to the position

selected on the back trimmer position.

Below the back trimmer control is the end-point adjustment (EPA) throw control. There are two adjustable controls. The one marked "high" controls the throttle and "low" controls the braking. The "high" trimmer will vary the throttle servo from 20° to 80° total travel. Maximum movement of 80° is in the full clockwise position. Similarly, the control marked "low" will vary a brake servo from 10° to 30° throw. Again, maximum throw is in the full clockwise position. Remember, however, that when the throttle servo reverse switch is in the reverse position, the end-point controls are reversed.

Rounding out the trimmer panel are the two servo-reversing switches for throttle and steering which are clearly marked "norm." and "rev."

Moving to the right, there is the throttle trim located on the front panel just above the transmitter crystal holder. It will vary the throttle servo center between throttle and brake by 18° , allowing you to set the spot where braking action takes place. Continuing to the right, there is the steering wheel and above it two controls previously mentioned, the steering dual-rate to the left and the steering trim to the right.

To the right of the steering wheel are the red LED power On indicator, the RF output meter, and the On/Off switch. Other controls, including the throttle trigger and back switch, can be seen in the side view drawing of the transmitter. Batteries are located in the pistol grip. The standard XL2P is delivered without

batteries. Either alkaline or nickel-cadmium batteries can be used. Airtronics sells the receiver and transmitter nickel-cadmium battery packs and a suitable charger as part #92021.

The Airtronics 92021 receiver is small, lightweight, and perfect for cars. I had no problem installing it in two cars. The same was also true of the XL2P/462 mini servos which were provided with the set. They were easy to mount and are versatile enough to be compatible with most cars on the market today. For those of you who are interested in nickel-cadmium packs for the XL2P, Airtronics #95021 with charger will fix you up. If you are in the market for a car or boat radio, take a good look at the Airtronics XL2P. I think you'll like it.

Charlie Kenney, c/o R/C Car Action, 632 Danbury Rd., Wilton, CT 06897.

**The following is the address of the company mentioned in this article:*

Airtronics, 11 Autry, Irvine, CA 92718. ■

MRP KONG

(Continued from page 63)

glue. I went down to the hobby store and grabbed some Sheldon's Posi-Cure gap-filling glue. I chose this because it dries slower than the regular instant adhesive, giving me more time to align the tire. Once this was completed, I mounted the tires on the chassis and proceeded to the intermediate checklist.

The next series of steps is for the installation of the speed controller and radio. The radio I chose was the Futaba*

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MRP KONG

(Continued from page 92)

the wire for the connector or battery pack as far away from the switch as possible. Make sure you are not cutting the connector that is to be plugged into the receiver.

Once again, strip 3/4 inch of insulation from the wires. Slide a piece of shrink tubing on the red and black wires from the switch. Now twist the two red wires together (one red wire from the con-

troller, one red wire from the switch) and solder together. Slide the shrink tubing over the soldered connection and heat with a match to shrink. Follow the same sequence with the black wires.

There is no need for the extra battery pack; you will have a fresh power supply each time you charge the main battery. Mount the On/Off switch on the cover lid and charge the battery. With the motor unplugged, turn on the switch and the radio to check the neutral position for each servo. If it isn't in the neutral

position, simply remove the splined servo horn and place on the servo to allow equal travel in each direction.

Now we're in the home stretch. Just a few more steps and it's time to romp. When mounting the roll bar, I found it was better to trim about 1/8 inch from the spacer to allow for a little more bite on the screw. Now mount the antenna to the roll bar, mount the cover lid to the control box, and drill mounting holes for the body (before painting). If you have any trouble painting the body, you can refer to the informative article about painting Lexan bodies by Rich Hemstreet elsewhere in this issue.

While waiting for the paint to dry, went through the adjustment section and performed all the fine adjustments. When the body was dry, it was time to unleash the "monster."

PERFORMANCE. To test this truck in terrain suitable for R/C cars would be a joke; this truck needs some rough stuff. With a ground clearance of almost 1 1/2 inches, this baby can handle some pretty big obstacles. Now you say to yourself, "1 1/2 inches; that's not much." But, when you take into consideration that most R/C cars have a ground clearance of 1/4 or 3/4 inch, the Kong is going to be walking pretty tall.

For a battery, I chose to use a potent Texson* Turbo Pack, along with the versatile and powerful Texson battery charger. After a routine check of steering and motor functions, it was time to let it rip! In loose sand, which would bring almost any two-wheel-drive vehicle to a slow crawl, the four-wheel-drive Kong whips past them, leaving in its wake a sandstorm for the competition to eat. On the hill climbs, the Kong begins where the others leave off, throwing columns of sand skyward only to rain down on its competitors stuck at the bottom of the hill.

As you can see, I'm pretty impressed with the Kong's performance. Just a word of warning to R/C car owners, don't park your cars in neat uniform rows, you could find the Kong dancing across your roof tops!

*The following are the addresses of the companies mentioned in this article:

MRP, 18676 142nd Ave., NE, Woodinville, WA 98072.

Sheldon's Hobby Shop, 3157 Alum Rock Ave., San Jose, CA 95127.

Pacer Technology & Resources, 1600 Dell Ave., Campbell, CA 95008.

Texson Precision Products, P.O. Box 420496, Miami, FL 33242. ■

AYK BUFFALO

(Continued from page 43)

Painting the body is all that's left to do. The paint job I did was an effort to reproduce the paint scheme on the box. To do this is very time consuming. To end up with a nice paint job you don't have to spend as much time as it took to build the car. Simply tape off the windows, paint with one color (two, if you're brave), and apply some decals. The best stickers I've ever seen for R/C cars are those under the name of Autographics*. They are exact duplicates of the decals that you would see on the world's most prestigious and exotic race cars and will add a sparkle to any R/C car.

Before putting this or any other R/C car through the ringer, it's a good idea to test all functions at the workbench, because it's better to find a problem here than on the track.

Now it's time to bring the Buffalo out to the fields to do a little cultivating!

PERFORMANCE. Flip the switch, put 'er on the ground, and bury the throttle with reckless abandon. Cultivating is exactly what my Buffalo did, leaving two uniform ruts in the earth as the tires spun at blinding speed. I could see each knob on the tires looking to grasp the next piece of earth to send skyward. The fact that the Buffalo had the peppy Magnum 600 tucked under its skin had slipped my mind for a moment, and I'll tell you, this baby can move!

The Buffalo can also take a pretty good shot due to its aluminum ladder frame. Should you ever hit something hard enough to break it, there is a complete line of replacement and high-performance parts available.

**The following are the addresses of the companies mentioned in this article:*

AYK Racing USA, P.O. Box 3479, Mission Viejo, CA 92690-1479.

Tower Hobbies, P.O. Box 778, Champaign, IL 61820.

Texson Precision Products, P.O. Box 420496, Miami, FL 33242.

Pacer Technology & Resources, 1600 Dell Ave., Campbell, CA 95008.

Autographics, 1700 14th St., Bakersfield, CA 93301. ■

COX SCORPION

(Continued from page 78)

The front wheel track is 7.15 inches and the rear is 7.32 inches. The overall weight is about 2½ pounds, ready to run. Power is supplied by a 6-cell battery pack and a

standard four-cell pack for the radio to operate on.

CONSTRUCTION. Assembly begins with the transmission, which is housed in a die-cast aluminum case, already assembled internally. The transmission gears include the new differential not found on earlier model Scorpions, which is in itself a quantum leap in the car's competitive edge. A Mabuchi RS-540 motor is also in place on the transmission, with high-speed gears mounted. Low-speed gears are included in the kit. The motor is fixed in its mount, which provides just the right gear mesh. No adjustment can be made, although the mounting holes can be reamed out to allow adjustment later on. The external gears are housed under a protective plastic cover, and this must be in place at all times, lest you want the center gear to drop out. Round out the assembly by attaching the rear shock towers.

At the front end is the familiar square rail frame mated to the front suspension. On the front there is the front spindle, servo saver mount/bash plate, and shock towers. Notable here are the instructions, which not only tell you what nuts, screws, and bolts to use, but are illustrated as well. Simply comparing the real thing to the illustration will confirm the right parts.

The front servo saver assembly is a spring-loaded affair, and seems quite adequate for the job. The front spindle is tempered steel and can be used to adjust the caster of the front geometry. All connecting ends are serviced with over-size ball joints for much stronger joints.

At the rear is the rear chassis plate and suspension plates. Mounting these to the rail frame creates one very rigid chassis which is straight and true. Place the transmission assembly on the chassis, and it starts to look like a car.

The rear chassis cage is next, which is a plastic assembly. It's held to the chassis with self-tapping screws, and is strong enough to resist hard knocks. Don't leave this out, because the upper body cage attaches to it.

The oil-filled dampeners come already assembled but have no oil in them. The kit includes a generous supply of shock oil, plus end seals with which to service the dampeners. I anticipated using the Turbo Scorpion on a very tough local track, so I elected to use a heavier oil than that which was supplied. This, of course, is the mechanic's preference. Spring coil-overs are also provided in the kit, and these are functional as they hold up the entire car. The spring retainers are adjustable, allowing varying spring rates.

Action from the dampeners was judged as very good, with progressive dampening in both directions.

Assemble and mount the rear suspension arms, which are the A-frame type and are made of cast aluminum. Oilite type bushings are already installed in the arms for the axles to ride in and are easily replaceable with optional ball bearings. The arms are held to the chassis by hardened pins at the rear chassis plate. Make sure the dog-bone axles are inserted first before final assembly.

Assemble and place the front suspension arms. Again, there are cast aluminum A-arms trailing from the spindles. The front end features castor locks for fast adjustment of the castor geometry, and a simple setscrew arrangement is provided. The shocks are mounted on the front and rear by polished ball joints to allow the suspension arms absolute freedom of movement. Place the tie-rods, followed by the front bumper and control links. For the most part, this finishes the front end.

Now install the aluminum roll bar at the rear. From here on out, it's all downhill. Mount the radio tub to the frame and attach it with machined screws in the chassis. The tub features a water-resistant control rod guide for the steering rod, and is really a thoughtful idea. Inside the tub, place the new three-speed throttle, which can be modified to have four speeds. You can also have reverse speed, and dynamic brakes are built-in. Believe me, you don't want to leave the brakes out of an off-road car.

Mount the motor battery to the bottom of the tub inside a large covered cavity. The wires from the speed controller poke through the tub via two highly conductive bolts. A two-wire harness hangs out the bottom to connect to the six-cell battery, and they have even made a small cubby hole in which to stick the connector and get it out of the way of the battery when mounted. A large plastic cover slides into the bottom to hold the battery in place. It can be removed within seconds to allow quick access to the battery.

Well, guess what? You now have an assembled car. You only need to mount the radio equipment and paint the body. Small bays are molded into the tub for the servos and there is plenty of room left to place the receiver and radio battery.

Painting the body is simple, with no trimming necessary. All mounting holes are already there, making for a perfect fit. I painted my Turbo Scorpion with acrylic lacquer and dressed it up with the

(Continued on page 97)

COX SCORPION

(Continued from page 95)

supplied sponsor stickers. The body is made of clear plastic polycarbonate and should last a long time.

Once the body is dressed up, mount the upper roll cage with two self-tapping screws. I recommend using washers between the screws and the body to prevent the screws from punching through the body later on. Mounting the body to the chassis requires only one body pin and four snaps.

Mounting the rear aerodynamic wing is the *coup de grace* and its deflection angle is fully adjustable. Once it's in place, you can stand back and admire your handiwork. The Turbo Scorpion really is a nice looking car. The front tires are quadruple-ribbed rubber on lightweight plastic rims, and the rear tires are wide track spiked tires. The rear tires are not heavily populated with spikes and are probably more suited to run in loose sand. Obviously you wouldn't want to run these on hard pavement because the spikes would disappear real fast!

The Turbo Scorpion has decorative headlights, a driver figure molded into the body, aircraft locking nuts in critical areas, and a nice rear-mounted antenna. In all, the Turbo Scorpion goes together well and it took me only two nights to assemble and get running. The next thing I had to do was to run her and see what kind of guts the Turbo Scorpion had.

PERFORMANCE. At the track, I found the Turbo Scorpion to be much faster out of the box than its earlier brother. The handling of the Turbo Scorpion was very good due to the much-improved suspension and over-size shocks. Dampening was rated excellent with the heavy oil, which I recommend, in the dampeners.

The added differential inside the Turbo Scorpion was well appreciated in the rough, allowing easy power slides without spin-outs. The updated tires worked very well, providing positive cornering ability with a minimum of tire burning from the rears.

Of course, the real acid test for any new car is putting it into an actual race. It just so happened that the local race club was holding one a few days after I completed this car. I entered the Turbo Scorpion in the two-wheel-drive Stock class and found a gob of cars already entered.

Well, the Turbo Scorpion was definitely competitive! She handled the track conditions with ease, making jumps nicely and landing on all fours to con-

the driver (they don't call me the Kamikaze for nothing), the Turbo Scorpion would have easily placed in the finals. She is that good a car!

There you have it, the car that was made a lot better by thoroughbred breeding. The Cox Turbo Scorpion has improved in handling, speed, and looks. The improvements are well worth the bother, and could make the Turbo Scorpion the Western scourge once again. If you're looking for a good pedigree car, look to the Cox Turbo Scorpion. It's an improved breed of car.

**The following is the address of the company mentioned in this article:*

Cox Hobbies, Inc., 1525 E. Warner Ave., Santa Ana, CA 92705. ■

RACO JAC-RABBIT

(Continued from page 61)

Next install the steering linkage. This step is a breeze because the steering linkage is assembled at the factory.

Mount the gigantic steering servo and the fuel tank. When fastening the servo to its mounts, be careful not to tighten it too much; it could distort the servo housing.

I messed up the next step. When installing the batteries and battery case, I put them in backward and, I'll tell you, it's really disappointing when you think it's all ready to go and you turn on the switch and nothing happens. Just take the time to do it right.

Bolt the roll cage to the side of the chassis. This only takes a minute or two to complete and is a very important step in making the chassis a little stronger.

Now we're in the home stretch. Install the rear axles and shocks. Don't jump the gun on this step and install the shocks first; you'll just have to take them out to install the axles. I know this because I did it incorrectly myself. Mount the tires next. This is a matter of eight bolts in the back and two in the front.

Are you itching to run it yet? Just a minute, you need a radio. I used the new XL2P pistol grip from Airtronics*. The XL2P has a reversible handle for left-handed operation, a trigger-operated throttle with proportional brake, trim, end point adjustments, and servo reverse. Other functions include a multi-function "back" switch for reverse, pre-set throttle and/or brake operations, and a wheel type directional control with trim, variable dual rate, and servo reverse. For a

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RACO JAC-RABBIT

more detailed report on this radio, see Charlie Kenney's review elsewhere in this issue.

Install the receiver according to the instructions. I recommend using a plastic bag or something similar to protect the receiver from moisture. It's in a very vulnerable spot and it gets very costly to keep replacing receivers. The car is just about done with the exception of the checks and adjustments following the radio installation. Once these steps are complete, get ready to have some serious fun!

PERFORMANCE. With a completion time of just an hour or so, it wasn't long before I was ready to do some stomping with the Jac-Rabbit. With the second pull, the powerful Zenoah engine came to life. After letting it warm up for a minute or so, it was time for the moment of truth!

My friend Rick handed me the radio and I squeezed the throttle. Without hesitation the Jac-Rabbit jumped from its pavement perch and began its assault on the long stretch of sand. With a top speed of 40-plus mph, it wasn't long before the car had reached the end of the beach, leaving two long and deep trenches from its enormous rear tires.

I decided to build a jump to test the car's flying ability. I circled around and hit it dead center; the Jac-Rabbit soared like an eagle. Due to its excellent weight distribution, the landing was perfect. The rear wheels came down first, and the car maintained good posture the whole way.

After running it for half an hour or so, I was convinced that this was the ultimate experience as far as R/C cars were concerned. But don't forget to heed the warnings of the manufacturer. Weighing in at more than 22 pounds and having a top speed of 40-plus, it's easy to imagine what this baby could do to a leg, so be careful.

And by the way, if you happen to see the tortoise, inform him that there is a new breed of racer in town, and its name is Jac-Rabbit!

**The following are the addresses of the companies mentioned in this article:*

Raco Modelcraft, Inc., 1421 E. St. Andrews Pl., Santa Ana, CA 92705.

Autographics of California, 1700 14th St., Bakersfield, CA 93301.

Pacer Technology & Resources, 1600 Dell Ave., Campbell, CA 95008.

Airtronics, 11 Autry, Irvine, CA 92718. ■

SPEED WEEK

(Continued from page 87)

The B Main was next with ten cars. At the end of the melee, Fred Sachs emerged victorious, a full lap ahead of second place Gene Hendricks. Fred posted a time of 14 laps in 4:15 and Hendricks had 13 laps in 4:10. Third place was Tim Lavigne with 13 laps in 4:12.

The A Main saw nine cars race. Dan Stokes finished just 2 seconds ahead of Kris Moore with a final of 14 laps in 4:06. Moore finished with 14 laps in 4:08 and he was followed by Duane Inouye only 1 second to the rear. Fourth and fifth place drivers, Cliff Lett and Peter Liu were a scant 6 seconds behind, crossing the finish line side-by-side with Lett only $\frac{3}{10}$ second in front.

In the Open class two-wheel drive, there was a full house ready to duel it out. The C Main saw seven cars take the starting flag. Ray Everhart made the cut only 3 seconds ahead of Randy Compton and third place Mike Hibler.

The B Main fielded nine cars. Butch Kloeber was victorious and earned a bump up to the A Main with Bill Steele a scant 2 seconds to the rear and Greg Fox 5 seconds later.

In the A Main all ten cars made the start. Kris Moore and Jack Johnson went at it for a short time while Moore ran traffic. It was just enough for Johnson to catch up and start the battle again. Johnson made his pass about 3 minutes into the race and started running away. He finished with a time of 15 laps in 4:11, and Moore with 15 laps in 4:18. Third place was Cliff Lett with 14 laps in 4:02. Johnson's car was a modified Associated RC10 on seven cells.

Now for the high-tech cars; the four-wheel-drive class. In this event, only four-wheel-drive Open class was run. The B Main saw good action and the same guy who beat the Open class two-wheel-drive drivers, Jack Johnson, took this race as well. His ride was an MIP/Associated four-wheel-drive. Second place went to Jeff Welch with Bill Gill in third.

The A Main started with 10 of the brutal cars stomping their way through the course and this was probably the finest race I've ever witnessed. Each car stayed right on the tail of the next guy. Johnson was driving a two-wheel-drive car in this class, and the nimble RC10 made its way to the front until 15 seconds to the end of the race when Johnson was hit by traffic and Paul Dionne whizzed by and took the checkered flag. On the

same lap as Dionne was Johnson, Ron Rossetti, Bryan Roden, and Jim Schauer. Dionne appeared to be driving a modified Yokomo car, and it drove flawlessly for the whole race.

The race had a formal awards presentation on Sunday, with thousands of dollars of merchandise handed out to the drivers and winners. A large trophy was also awarded to the driver who managed to drive more than a few events and come out winning. This was known as the Iron Man Trophy, and it went to big Dan Stokes, who competed in four separate classes.

Sponsors who contributed to the race included Sanyo, MRC-Tamiya, Associated Electrics, Pro-Line, Thorp, Trinity, Cook Racing, BoLink (who also furnished the scoring computer), Parma, RPS, Micro Power, McCoy, RevTech, Twinn-K, Kraft Radios, Futaba Radios, Bilba, CRP, Autographics, Airtronics, and Paris Racing.

It was certainly a great week of motor sport racing, even for spectators. The Frontier Hotel is thanked for its generosity in holding the race on its famous casino grounds, and they overwhelmingly voted to hold it next year. If you are into the sport, and love to race, then Speed Week is the place for you. ■

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